

The Impact of ESG Disclosure and Performance on the Financial Performance of Listed Companies in Hong Kong

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Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed: Yuen Wai Kuen Date: 31 October 2025

STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used the extent and nature of the correction is clearly marked in a footnote(s). Other sources are acknowledged by footnotes giving explicit references. A list of references is appended.

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ABSTRACT

The study investigates the impact of ESG disclosure and performance on the firm performance of listed companies in Hong Kong from 2017 to 2019. The research focuses on 178 companies across four sectors (property development, transport, public utilities and catering). Data were obtained from the Bloomberg database, annual reports, and published financial statements of these firms. The analysis employed panel data regression, considering five independent variables: ESG disclosure, overall ESG performance, and individual ESG performance along with two control variables: market capitalization and proportion of independent directors. Firm performance was measured by Return on Assets (ROA), Return on Equity (ROE), and Earnings per share (EPS).

The findings of this study suggest that there was no significant relationship between ESG variables and firm performance. However, a negative association was observed between overall ESG performance and EPS. These results indicate that, for most measures, ESG practices have a limited direct impact on financial performance. While the findings are consistent with some prior studies reporting a neutral relationship, they contradict the majority of the literature, which has identified significant positive relationships. This highlights the need for further research to investigate the underlying reasons for these insignificant relationships and to gain a deeper understanding of how ESG factors influence firm performance.

This study also revealed that the utilities sector outperformed others in environmental, social, and overall performance, while the public transport sector excelled specifically in the governance dimension. In contrast, the property and catering sectors lagged behind across all ESG dimensions. Future research could investigate the specific factors that influence or challenge ESG performance within different industries.

Keywords- ESG disclosure, ESG performance, Firm Performance, Financial performance, Stakeholder theory, Panel regression model

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

The interplay between Environmental, Social, and Governance (ESG) factors and firm performance has become a focal point of interest for both researchers and practitioners. Over the past two decades, ESG has gained substantial attraction in management practices and scholarly research (Bansal, 2002; Dyllick & Hockerts, 2002; Hart & Milstein, 1999). The topic on environmental, social, and governance (ESG) becomes increasingly important in the global business environment. Understanding how ESG practices impact financial performance is crucial for business, investors, and policymakers.

Environmental, Social and Governance (ESG) refers to a framework used to evaluate a company's performance and practices concerning three key dimensions: environmental, social and governance. (UN Global Compact 2004); Environmental aspects focus on a company's impact on the natural environment and its efforts to mitigate environmental risks. This includes managing resource use, reducing emissions and addressing climate-related challenges. Key indicators include carbon emissions, energy efficiency and climate change policies etc. The social components evaluate how a company manages relationships with its employees, customers, suppliers and the communities. It addresses issues such as equity, fairness, employee well-being, human rights and community engagement etc. The governance aspect examines the structures, policies and practice that guide a company's decision-making and ensure accountability. It

covers transparency, ethical leadership and protecting shareholders' interests. Key factors include board composition, shareholder rights and anti-corruption measures.

These dimensions help assess a firm's sustainability, ethical impact, and long-term value creation beyond traditional financial metrics. The growing recognition among investors, regulators, and stakeholders highlights the significant influence of these factors on a corporation's long-term viability and profitability. For instance, Evans and Peiris (2012) indicated that a significant and positive relationship between ESG performance and firm valuation, indicating that investors increasingly favour companies with strong ESG practices.

The ESG concept has its origins in Corporate Social Responsibility (CSR) and Sustainable Development (SD). (UN Global Compact 2004; UNEP FI 2004). The 2008-2009 global financial crisis triggered reforms to strengthen corporate governance and CSR practices, driving greater emphasis on transparency, reputation management and social and environmental performance (Galbreath, 2013; Nicholson & Kiel-Christholm, 2011). Over time, ESG has evolved from a peripheral concern to a central component of business strategies, bolstered by global reporting standards such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and Task Force on Climate-related Financial Disclosures (TCFD). These frameworks have standardized ESG reporting and elevated its importance in global markets, influencing both investor sentiment and regulatory priorities (La Torre et al., 2020).

According to Jamali et al. (2017) and Turban & Greening (1997), ESG embodies a firm's responsibility to improve social welfare and create equitable, sustainable long-

term wealth for stakeholders. Khan et al. (2016) further argue that companies investing in sustainable practices achieve better financial performance when those investments align with issues that are financially material to their operation. ESG performance criteria also serve as operational standards used by companies and socially responsible investors to identify suitable investment opportunities.

The emergence of ESG factors as critical considerations for investors, policymakers, and corporations reflects a growing emphasis on evaluating the long-term sustainability and societal impact of business operations. ESG is no longer limited to compliances or philanthropy; it has become a strategic imperative that drives innovation, mitigates risks and enhances financial performance (Buffo & Patalano, 2020). Corporate management increasingly recognizes that the integration of ESG practices can mitigate a firm's exposure to reputational, political, and regulatory risks, potentially leading to more stable cash flows and improved profitability (Giese et al., 2019). These benefits are particularly evident in industries with high stakeholder scrutiny, where ESG initiatives can enhance trust, reduce regulatory fines, and ensure operational continuity.

Firm performance, often measured using metrics such as Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS), is increasingly viewed through the lens of ESG factors. Investors and asset managers are integrating ESG considerations into their investment analysis and decision-making processes, recognizing that these factors can materially affect a company's performance and risk profile. For example, Lee (2017) notes that ESG performance is particularly scrutinized in emerging markets, where strong ESG practices are associated with robust risk management.

Corporate management now acknowledges that integrating ESG practices can mitigate reputational, political, and regulatory risks, leading to more stable cash flows and improved profitability (Khan, Serafeim & Yoon 2016; Giese et al. 2019; Friede, Busch & Bassen 2015).

This evolving perspective underscores ESG's growing importance in shaping corporate strategy and financial outcomes in the modern business landscape.

1.2 The Convergence of CSR and ESG

The concepts of Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) are closely related but differ in their scope, application, and strategic significance (Eccles, R.G. & Klimenko, S. 2019). CSR traditionally refers to a company's voluntary integration of social and environmental concerns into its business operations and interactions with stakeholders. This often manifests as philanthropic activities, community engagement, or sustainability initiatives designed to demonstrate a company's commitment to ethical practices and societal well-being.

However, over the past two decades, CSR has progressively evolved into the broader, more systematic framework of ESG. While CSR is sometimes viewed as discretionary or even symbolic, ESG represents a set of measurable criteria used by investors, regulators, and corporations to assess a firm's long-term sustainability, operational resilience, and ethical conduct (Elkington, 1997; Kouaib et al., 2020). ESG encompasses three core pillars: Environmental: Assessing how a company minimizes its ecological footprint and manages environmental risks. Social: Evaluating the

company's treatment of employees, customers, suppliers, and its impact on communities. Governance: Examining corporate governance structures, board effectiveness, transparency, and accountability.

The mounting interest in ESG is driven by increased awareness of global sustainability challenges, stakeholder activism, and the recognition that responsible business practices are critical for long-term value creation. The shift from CSR to ESG has been accelerated by external pressures from governments, non-governmental organizations (NGOs), institutional investors, and society at large, all demanding greater accountability and transparency from corporations (Kotsantonis et al., 2016).

Moreover, the ESG framework is closely aligned with the “triple bottom line” approach, which integrates environmental stewardship (planet), social responsibility (people), and economic performance (profit) into corporate decision-making. This approach has become increasingly relevant as companies seek to address complex global issues such as climate change, inequality, and governance failures (Elkington, 1997, Kouaib et al., 2020.).

The rise of sustainable investing further reinforces the centrality of ESG. Investors now routinely incorporate ESG criteria into their investment analysis and portfolio construction, with global assets in ESG-oriented funds surpassing \$35 trillion in 2020 (GSIA, 2020). Institutional investors and asset managers perceive ESG factors as key indicators of a company's risk management capabilities and long-term financial health (MSCI, 2020). This global trend has not only influenced corporate strategies but also prompted the development of international and regional ESG reporting standards, such

as those from the Global Reporting Initiative (GRI), the Principles for Responsible Investment (PRI), and the Task Force on Climate-related Financial Disclosures (TCFD).

In summary, the convergence of CSR and ESG reflects a paradigm shift in corporate sustainability, moving from voluntary, reputation-driven initiatives toward integrated, data-driven frameworks that link sustainability with financial performance and competitive advantage. (UN Global Compact 2004; Clark, Feiner & Viehs 2015; Khan, Serafeim & Yoon 2016) As ESG becomes embedded in the mainstream of business strategy and investment decisions, its influence in firm performance, stakeholder relations and societal outcomes continues to grow.

1.3 Scope of the Study

This research aims to examine the impact of ESG disclosure and performance on firm performance, while considering key controlling variables. Given the complexity of analysing the entire economy, this study adopts a targeted approach by selecting four major sectors : property development, transport, public utilities, and catering. These sectors were selected because of their significant environmental and social impacts within Hong Kong. In addition, they serve as the city's main economic pillars, contributing over 15% to Hong Kong's economy (C&SD, 2023).

Property development sector is a cornerstone of Hong Kong's economy, playing a vital role in GDP generation and employment (C&SD 2023). It plays a foundational role in Hong Kong's economy, contributing significantly to GDP and employment. However, it is also a major consumer of natural resources and a significant source of carbon

emissions (Environment Bureau 2021, EMSD 2023). With increasing regulatory pressures promoting green buildings and sustainable urban planning, ESG performance in this sector is crucial for aligning business practices with environmental sustainability and economic growth.

Similarly, the transportation sector is essential in Hong Kong's densely populated urban environment and relies heavily on efficient and sustainable transportation system. The sector is a considerable contributor to greenhouse gas emissions. ESG strategies, such as investments in electric vehicles and low-emission public transport, are increasing vital for reducing environmental impact, complying with regulatory standards, and enhancing operational reliability. (Environment Bureau 2021, EPD 2024).

The public utilities sector is under strict regulatory oversight, companies in this sector are compelled to prioritize sustainability and make long-term investments, making ESG performance central to their operational stability and resilience. (Environment Bureau 2021; EMSD 2023). Finally, the catering industry plays a crucial role in managing food waste, reducing energy consumption, and promoting ethical sourcing. As consumer awareness of sustainability increases, firms in this labour-intensive industry must emphasize social responsibility—such as employee welfare and sustainable practices—to maintain their reputation and competitiveness. (EPD 2023).

By focusing on these four sectors, the research aims to generate nuanced, sector-specific insights into the relationship between ESG factors and firm performance in the Hong Kong context. This targeted approach enables a detailed examination of how ESG practices interact with industry dynamic, regulatory pressures, and stakeholder

expectations, while also allowing for comparative analysis across sectors.

The study period covers 2017–2019, a timeframe that captures recent developments in ESG regulations and practices in Hong Kong. The analysis considers both ESG disclosure (the extent and quality of reporting) and ESG performance (the actual implementation of sustainability practices), as well as the individual contributions of environmental, social, and governance components. Control variables such as firm size and the proportion of independent directors on the board are included to account for firm-specific characteristics that may influence performance outcomes.

1.4 Research Objectives

This study examines how ESG disclosure, overall ESG performance and individual ESG components (environmental, social, and governance) relate to financial indicators such as Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS). It also explores the individual effects of environmental, social and governance components on firm performance. The sectoral differences in ESG practices across property development, transport, public utilities, and catering are also explored.

1.5 Research Questions

To address the research objectives, this study will consider the following research questions:

1. How do ESG performance and disclosure influence the financial performance

- of Hong Kong's listed companies in the property development, transport, public utilities and catering sectors?
2. How do individual ESG components (environmental, social, and governance) influence companies' financial performance?
 3. What are the sectoral differences in ESG practices across the 4 sectors?

1.6 Research Gaps

Despite increasing attention on ESG factors, the relationship between ESG disclosure, ESG performance, and firm performance remains inconsistent in the literature. While some studies (Orlitzky et al., 2003; Clarkson et al., 2011) reported positive relationships, others (Margolis et al., 2007; Hong & Kacperczyk, 2009) found no significant or even negative effects. For example, Margolis et al. (2007) conducted a meta-analysis of CSR and financial performance, reporting mixed results, including instances of no significant relationship. Similarly, Hong and Kacperczyk (2009) found negative effects in cases where firms' environmental or social practices conflicted with immediate profit maximization, such as divesting from controversial industries like tobacco or firearms. These contradictions highlight the need for more focused research, particularly in underexplored markets like Hong Kong.

In addition, many studies have concentrated on overseas markets, such as the United States, Europe, and well-established Asian markets like Japan and Singapore (Friede et al., 2015; Gillan et al., 2021). This leaves a significant gap in understanding how ESG factors affect firm performance in Hong Kong. Hong Kong's unique market dynamics,

regulatory environment, and investor preferences require specific attention to evaluate ESG impacts within this context.

Another limitation in the literature is the tendency to examine either ESG disclosure or ESG performance in isolation, with few studies analysing both factors simultaneously. For example, Wang et al. (2022) and Dyck et al. (2019) emphasize that ESG disclosure and ESG performance are distinct and may not always align. ESG disclosure focuses on transparency and reporting, while ESG performance reflects the actual implementation of sustainability practices. Both factors have different implications for firm performance, and their interaction remains underexplored.

Additionally, most studies rely on aggregated ESG scores, which can obscure the unique contributions of each ESG dimension. There is limited research on the individual effects of Environmental (E), Social (S), and Governance (G) components on firm performance. This gap is critical as prior research (e.g., Khan et al., 2016; Friede et al., 2015) suggests that the influence of each ESG dimension may vary depending on industry and regional context. For instance, Khan et al. (2016) found that governance practices are particularly impactful in industries with complex regulatory requirements, while environmental initiatives are more relevant in resource-intensive sectors.

These research gaps underscore the need for more nuanced studies that examine sectoral and regional differences, integrate both ESG disclosure and performance, and disaggregate ESG dimensions to provide a more comprehensive understanding of their impact on firm performance.

1.7 Significance and Contributions of the Study

This study provides empirical evidence on the relationship between ESG factors and firm performance within the unique market context of Hong Kong-listed companies. By focusing on this under-researched market, the research challenges and extends existing theoretical linkages between ESG and firm performance, offering insights into the dynamics of emerging and fast-evolving financial markets.

The findings have significant implications for policymakers and regulators in Hong Kong, helping them refine ESG-related guidelines, disclosure requirements, and policies tailored to the market's specific needs. By disaggregating ESG into its individual components—environmental, social, and governance—the study evaluates how each dimension impacts financial performance. Specifically, this research makes several key contributions.

This study also bridges the regional gap and addresses the relative scarcity of empirical ESG research in rapidly evolving financial markets like Hong Kong. Most prior studies have concentrated on overseas markets, leaving a gap in understanding the dynamics of ESG in Asian financial hubs (Friede et al., 2015; Gillan et al., 2021). The findings offer valuable insights into how local regulatory environments, market structures, and cultural factors influence the ESG–financial performance nexus.

Unlike many existing studies that utilize aggregated ESG scores, this research analyses the individual impact of the environmental, social, and governance components on firm performance. This approach provides a more granular understanding of which ESG

pillars are most influential in different sectors, supporting more targeted strategic and policy interventions (Khan et al., 2016).

The study applies both stakeholder theory and signalling theory within the Hong Kong context. By examining the both ESG disclosure and ESG performance, the research sheds light on how transparency, substantive action, and stakeholder perceptions interact to shape business outcomes. This theoretical advancement helps clarify the mechanisms through which ESG factors influence firm value.

The results provide actionable recommendations for corporate leaders, investors, and managers, highlighting the ESG practices that drive financial performance in their sector and informing resource allocation and strategic planning. For policymakers and regulators, the study's evidence supports the design of ESG guidelines and reporting frameworks that are tailored to Hong Kong's market realities.

By situating its findings within the broader international literature, the study enables meaningful comparisons across different markets and regulatory regimes. This comparative perspective enriches the global conversation on ESG integration, responsible investing, and sustainable business practices.

As investors and businesses in Hong Kong and China, increasingly prioritize ESG considerations to align with global sustainability trends and evolving regulatory frameworks, this research offers critical insights into the relationship between ESG practices and firm performance. While Hong Kong-listed companies are leveraging ESG reporting to maintain their competitiveness as a global financial hub, Chinese

companies are aligning their ESG efforts with the country's broader national policies, such as the "Dual Carbon Goals," which aim to achieve carbon peaking by 2030 and carbon neutrality by 2060.

In summary, this research not only contributes to the academic literature on ESG integration and firm performance but also informs corporate decision-making, guides investor strategies, and supports the development of ESG policies in Hong Kong. The findings can be compared with research from other markets, enriching the global ESG discourse and fostering a better understanding of ESG practices in diverse contexts.

1.8 Thesis Structure

This thesis is structured into six interconnected chapters to systematically explore the relationship between Environmental, Social, and Governance (ESG) factors and firm performance among Hong Kong-listed companies. Each chapter is designed to ensure a logical progression of ideas and a comprehensive understanding of the research topic as follows:

Chapter One establishes the foundation of the research by presenting the background, context, and significance of the study. It identifies the research problem and its relevance in the context of the increasing focus on ESG practices globally and in Hong Kong. The chapter defines the research aims, objectives, and questions that guide the investigation. Additionally, it highlights the theoretical and practical contributions of the study, explaining how it addresses gaps in the existing literature and provides actionable insights for firms, investors, and policymakers. The scope, assumptions, and limitations of the research are also discussed, ensuring transparency and clarity about

the study's boundaries.

Chapter Two presents an in-depth review of the existing body of knowledge on ESG factors and their relationship with firm performance. It begins with a discussion of the theoretical frameworks underpinning the study, including stakeholder theory, agency theory, legitimacy theory, and signalling theory, which provide the conceptual foundation for understanding how ESG practices influence financial outcomes. The chapter examines key empirical findings from prior studies, critically analysing methodologies, results, and gaps in the literature. It identifies inconsistencies and unresolved questions, justifying the need for the current study. The chapter also explores regional and sector-specific insights, emphasizing the unique context of Hong Kong-listed companies.

Chapter Three is building on the literature review. It develops the conceptual framework for the study. The framework integrates theoretical insights and empirical evidence to outline the relationships between ESG disclosure, ESG performance, and firm performance. The chapter explores how ESG transparency and practices influence financial metrics such as Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS). A total of six hypotheses are formulated, addressing both aggregate ESG scores and individual pillars (Environmental, Social, and Governance). This chapter provides the theoretical and empirical justification for the hypotheses, offering a clear roadmap for the analysis.

Chapter Four outlines the research design and methodology employed to test the hypotheses and achieve the research objectives. It describes the quantitative research

approach, which is grounded in deductive reasoning and panel data regression analysis. The chapter details the data collection process, including the selection of firms, industries, and time periods, and explains the rationale for using Bloomberg Terminal as the primary data source. Key variables—dependent, independent, and control—are defined, and their measurement is justified based on prior studies. The chapter also discusses the statistical techniques used to analyse the data, including model selection procedures and robustness checks. Assumptions and limitations of the methodology are addressed to ensure transparency and reliability.

Chapter Five presents the results of the data analysis and interprets them in the context of the research hypotheses and theoretical framework. Descriptive statistics, correlation matrices, and regression outputs are discussed in detail, highlighting key findings and their implications. The chapter examines whether the hypotheses are supported or refuted and provides insights into the strength and direction of the relationships between ESG factors and firm performance. It also compares the results with prior studies, identifying areas of alignment and divergence. The discussion addresses the practical implications for managers, investors, and policymakers, as well as the broader significance of the findings for the field of ESG research.

Chapter Six, the final chapter summarizes the key findings and contributions of the study, reflecting on how they address the research questions and objectives. It discusses the theoretical advancements made in understanding the ESG-firm performance relationship and highlights practical recommendations for firms seeking to enhance their sustainability practices. Limitations of the study are revisited, providing a balanced perspective on its findings. The chapter concludes by offering directions for

future research, emphasizing the need for longitudinal studies, broader sectoral coverage, and alternative ESG measurement approaches to further advance the field.

The structure of this thesis ensures a coherent flow of ideas, progressing from the identification of the research problem to the analysis of findings and their implications. By combining theoretical rigor with empirical evidence, the thesis aims to provide meaningful insights into the growing importance of ESG practices in the corporate world.

1.9 Chapter Summary

This chapter introduced the research topic by providing a comprehensive overview of the study's background, significance, and objectives. It began by contextualizing the growing global emphasis on Environmental, Social, and Governance (ESG) practices and their relevance to firm performance. The chapter highlighted the critical role ESG factors play in shaping corporate strategies, particularly in the Hong Kong market, where sustainability reporting and transparency have gained increasing importance due to evolving regulatory and stakeholder pressures.

The research problem was clearly articulated, identifying the gaps and inconsistencies in existing literature regarding the impact of ESG factors on financial performance. The chapter outlined the study's aims and objectives, emphasizing its contributions to both academic literature and practical decision-making. The research questions were presented, focusing on how ESG disclosure and performance influence financial metrics such as ROA, ROE, and EPS.

Additionally, the chapter provided an overview of the scope of the study, explaining the focus on Hong Kong-listed companies and the use of quantitative methods to ensure objectivity and generalizability. The chapter concluded with a detailed outline of the thesis structure. Each chapter was briefly described, demonstrating how the research progresses from theoretical foundations and hypothesis development to robust data analysis and practical recommendations.

In summary, this chapter sets the stage for the research by defining its context, purpose, and significance. It provided a clear and structured foundation for the subsequent chapters, ensuring a logical progression of ideas. The next chapter, the evolution of ESG requirements will show the various ESG reporting standards and ESG reporting requirements in Hong Kong. The chapter on Literature Review will delve into the theoretical and empirical studies related to ESG factors and firm performance, identifying gaps and opportunities for further exploration.

CHAPTER TWO

THE EVOLUTION OF ESG DISCLOSURE REQUIREMENTS

2.1 Introduction

Over the past three decades, corporate responsibility has evolved from discretionary Corporate Social Responsibility (CSR) initiatives to an integrated Environmental, Social, and Governance (ESG) paradigm embedded in strategy, risk management, and capital allocation. Early CSR emphasized philanthropy, community relations, and reputational stewardship. In contrast, ESG reframes responsibility as measurable performance on material issues that affect enterprise risk, resilience, and long-term value. This shift was catalysed by several forces: post-crisis governance reforms, intensifying climate and social risks, stakeholder activism, and the rise of responsible investment (Eccles and Klimenko, 2019).

Hong Kong, as a leading financial hub in Asia, has actively embraced the global ESG movement. The Hong Kong Stock Exchange (SEHK) first introduced ESG reporting guidelines in 2012, adopting a "comply or explain" approach to encourage transparency and accountability. Over time, these guidelines have evolved, aligning with international standards such as the Task Force on Climate-related Financial Disclosures (TCFD) and the International Sustainability Standards Board (ISSB). This reflects Hong Kong's commitment to promoting sustainable finance and corporate governance, ensuring that its financial sector remains competitive and aligned with global trends.

The growing recognition of ESG's importance is not limited to regulatory and corporate spheres. Institutional investors, including pension funds, asset managers, and sovereign wealth funds, are increasingly integrating ESG criteria into their investment strategies (Global Sustainable Investment Alliance, 2020). This shift is driven by evidence that ESG factors materially impact a company's financial performance and risk profile. Furthermore, employees, customers, and the broader public now expect companies to address pressing social and environmental issues, placing additional pressure on firms to demonstrate sound governance practices and sustainable operations. Failure to meet these expectations can result in reputational damage, loss of public trust, and diminished competitive advantage.

2.2 ESG Reporting Frameworks and Standards

2.2.1 Global Reporting Initiative (GRI)

The Global Reporting Initiative (GRI), established in 1997, is the most widely adopted framework for ESG reporting. It provides comprehensive guidelines for organisations to disclose their environmental, social and governance impacts, enabling stakeholders to assess their sustainability performance. GRI is an international organisation and its standards help companies harmonize reporting on their different ESG impacts. It has become a cornerstone for organisations seeking to build credibility and trust through transparent reporting. A report issued by GRI in 2018 showed that 12,964 companies worldwide had issued 50,197 sustainability reports on voluntary basis, regarding various dimensions of ESG information disclosure (GRI 2018).

GRI offers a modular structure consisting of universal standards, topic-specific standards, and sector standards. Universal standards are applicable to all organizations, focusing on general disclosures (e.g., organizational profile, governance structure). Topic-specific standards address material issues related to environmental, social, and governance areas, such as emissions, labour practices and anti-corruption. Sector standards focus on industry-specific issues, providing tailored guidance for sectors like energy, construction, and transportation.

GRI emphasizes materiality, requiring companies to focus their reporting on issues that are most significant to stakeholders and the organization's sustainability impact. It also encourages active engagement with stakeholders to identify their concerns and expectations, ensuring that reporting is relevant and aligned with stakeholder needs. GRI is recognized internationally, making it easier for companies to align their reporting with global sustainability expectations.

By adopting GRI standards, organizations can enhance their credibility through transparent reporting, identify and mitigate sustainability risks and build trust with investors and stakeholders by demonstrating a commitment to responsible business practices.

The Objectives and Purposes Analysis within GRI is a systematic process to align corporate sustainability practices with global goals (GRI 2016). It includes defining objectives which identifying sustainability goals aligned with a company's vision and operations (e.g., reducing carbon emissions, improving labour conditions). It also analysing how sustainability initiatives contribute to broader global objectives, such as

the United Nations Sustainable Development Goals (SDGs), ensuring alignment with global benchmarks.

The benefit of GRI lies in its global comparability as it is the widely used sustainability framework. Its completeness emphasising on due diligences and value-chain impacts and increasing alignment with ISSB and improves coherence for multi-framework reporters and credibility with clear structure enables external assurance.

2.2.2 Principles for Responsible Investment (PRI)

One of the forerunners in sustainability reporting is the United Nations Principles for Responsible Investment (PRI). Launched in 2006 by the United Nations, PRI is a global initiative that encourages investors to integrate ESG factors into their decision making and ownership practices. It represents a shift in the investment landscape, emphasizing the financial materiality of ESG considerations. The UN PRI has grown to become the world's leading proponent of responsible investment, with over 4,000 signatories representing more than \$121 trillion in assets under management as of 2022 (PRI Bulletin, 2002). It provides a comprehensive framework and guidelines for investors to follow, covering areas such as active ownership, ESG integration, and collaborative initiatives. Specific principles are designed to help investors better understand and manage the risks and opportunities associated with ESG factors, ultimately contributing to more sustainable and responsible investment practices. The growing global adoption of the UN PRI reflects the increasing recognition among the investment community that ESG factors can have a material impact on long-term firm performance and investment risk. By aligning with the UN PRI, investors can demonstrate their

commitment to sustainable investing and their contributions to the broader goals of sustainable development.

The UN PRI aims to promote transparency and accountability within the investment industry by requiring the companies to report on their progress of implementation. It helps to drive more meaningful ESG integration and disclosures and encourages collaboration among its companies and investors, facilitating the sharing of best practices, knowledge, and resources. This collaborative approach helps to amplify the impact of responsible investment initiatives and promote wider adoption of ESG integration.

In addition, the UN PRI helps to shape regulatory frameworks and policies that support and incentivize ESG integration. This includes initiatives such as promoting mandatory ESG disclosure requirements and sustainable finance taxonomies. Over the years, the UN PRI has helped to legitimize and mainstream responsible investment practices and has contributed to the significant growth in ESG-focused investment products, services, and strategies over the past decade (UN PRI, 2023; PRI Annual Report, 2023). It also offers a range of educational resources, tools, and guidance to help investors develop the necessary knowledge and skills to effectively integrate ESG factors into their investment processes.

Overall, the UN PRI has been instrumental in driving the integration of ESG considerations into the global investment landscape. By establishing standards, promoting transparency, and facilitating collaborative action, the UN PRI has played a pivotal role in accelerating the adoption of responsible investment practices worldwide.

2.2.3 Task Force on Climate-Related Financial Disclosures (TCFD)

TCFD was established in 2015 by the Financial Stability Board, an international body that monitors and makes recommendations about the global financial system. The TCFD was created with the purpose of developing a set of consistent, voluntary climate-related financial risk disclosures for use by companies in providing information to lenders, insurers, investors, and other stakeholders (TCFD 2017).

The primary objectives of TCFD are to develop recommendations for more effective climate-related disclosures that could promote more informed investment, credit, and insurance underwriting decisions, and to enable stakeholders to better understand the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks.

The TCFD recognized that climate-related risks and opportunities are becoming increasingly important for organizations to consider in their strategic planning, risk management, and capital allocation decisions. However, the lack of standardized, comparable, and decision-useful climate-related financial information was hindering the ability of financial markets to accurately price climate-related risks and opportunities.

To address this gap, the TCFD developed a framework for climate-related financial disclosures organized around four key areas: governance, strategy, risk management, and metrics and targets. The TCFD recommendations provide a structure for companies

to disclose how they are assessing and managing climate-related risks and opportunities, helping to improve transparency and enable more informed decision-making by investors and other stakeholders. Many countries and jurisdictions are also moving towards mandatory climate-related financial disclosure requirements, further underscoring the importance of the TCFD framework in driving more transparent and consistent reporting on climate-related financial risks and opportunities.

The TCFD has developed a framework with four core elements that organizations should disclose to help stakeholders understand their climate-related risks and opportunities, namely governance, strategy, risk management and targets (TCFD 2017). Governance disclosure is referring to the organization's governance around climate-related risks and opportunities and the management's role in assessing and managing climate-related risks and opportunities. Strategy refers to the disclosure of the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning. Risk management refers to the disclosure of how the organization identifies, assesses, and manages climate-related risks. The targets refer to the disclosure of the metrics and targets used to assess and manage relevant climate-related risks and opportunities and opportunities in line with its strategy and risk management process in relation to the disclosure of Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. It also describes the targets used by the organization to manage climate-related risks and opportunities and performance against these targets.

The TCFD recommendations provide a standardized framework for organizations to disclose decision-useful, climate-related financial information to their stakeholders. By

adopting these recommendations, organizations can enhance transparency, enable more informed decision-making, and support the transition to a low-carbon economy.

2.2.4 International Sustainability Standards Board (ISSB)

The International Sustainability Standards Board (ISSB) is an organization established to develop and maintain a comprehensive global baseline of sustainability disclosure standards that provide investors and other capital market participants with information about a company's sustainability-related risks and opportunities. It was formed in November 2021, under the auspices of the IFRS Foundation, which also oversees the International Financial Reporting Standards (IFRS). The primary goal of the ISSB is to create standards that enhance the consistency, comparability, and reliability of sustainability reporting across different sectors and regions. It focuses on sustainability matters that are financially material, meaning they could impact the financial performance of a business. This includes environmental, social, and governance (ESG) factors. To drive ESG and sustainability agenda amongst listed issuers, the HKEX has require issuers to make climate-related disclosures in accordance with IFRS in phases (HKEX 2024).

2.2.5 Sustainable Development Goals (SDGs)

Corporate Social Responsibility (CSR) initiatives encourage corporations to adhere to predefined norms and values. The United Nations Global Compact, launched in 2000, provides a network for companies, trade unions, and NGOs, focusing on 10 principles related to human rights, labour rights, the environment, and anti-corruption.

In 2015, the United Nation General Assembly (UNGA) adopted a document titled "Transforming Our World: The 2030 Agenda for Sustainable Development,". It represented a world plan for taking action by 2030 to tackle global challenges of environmental degradation and poverty (UN, 2015; UNGA, 2015). It includes 17 comprehensive goals (UNGA, 2015a) aiming at ending poverty and hunger, protecting human rights, and safeguarding the planet (See Table 1 below). These Sustainable Development Goals (SDGs) replaced the Millennium Development Goals (MDGs) and involve a bottom-up approach engaging governments, international institutions, civil society, businesses, and academia (UNGA, 2015b). Specifically, businesses are called upon to contribute to the achievement of the Sustainable Development Goals (UNGA, 2015c), which are supported by 169 targets guiding their implementation. Although not legally binding, these goals provide a framework for sustainable efforts, allowing discretion in how they are achieved by governments and companies. Achieving these goals requires measurable progress (Biermann et al., 2017) and frameworks such as the GRI and UN Global Compact guidelines help facilitate their integration. Companies should prioritize material issues, measure progress, and communicate to stakeholders for transparency and value creation.

Table 1: United Nations’ 17 Sustainable Development Goals

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure the availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts*
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Source: Extract from “Transforming our World: the 2030 Agenda for Sustainable Development” Resolution adopted by General Assembly on 25 September 2015, P.14

The United Nations SDGs provide companies with opportunities to adopt sustainable business models and strategies (Schramade, 2017). Various frameworks have been developed to standardize and assist companies in implementing and reporting on the SDGs. The GRI Sustainability Reporting Standards, for example, offer international guidelines for sustainability reporting. The UN Global Compact, working with the Global Reporting Initiative (GRI) and the World Business Council for Sustainable Development (WBCSD), has introduced several guidelines to help organizations align their efforts. These include the Sustainable Development Goals Guidelines, United Nations Global Compact Goals (UN Global Compact & GRI 2017), and Practical Guidelines for Defining Priorities and Reporting (UN Global Compact & GRI 2018).

The tripartite structure of ESG - environmental, social, and governance - directly corresponds to various SDGs. Specifically, the environmental aspects of ESG reporting align with SDGs such as Climate Action (Goal 13), Life Below Water (Goal 14), and Life on Land (Goal 15). The social dimension of ESG correlates with SDGs like Good Health and Well-Being (Goal 3), Gender Equality (Goal 5), and Decent Work and Economic Growth (Goal 8). Governance aspects of ESG find resonance in SDGs related to corporate governance, peace, justice, and strong institutions (Goal 16).

To effectively integrate SDGs into their ESG strategy, corporate management should undertake a systematic approach. This involves identifying and prioritizing sustainability issues most pertinent to their business model and industry context. Companies should then establish mechanisms to measure and monitor their progress towards these global sustainability targets. Regular communication of these efforts and achievements to key stakeholders - including investors, customers, and regulatory bodies - is crucial for fostering transparency and demonstrating long-term value creation. This strategic alignment of ESG reporting with SDGs not only enhances corporate sustainability efforts but also positions companies favourably in an increasingly conscientious global market.

2.3 ESG Regulatory Bodies in Hong Kong and China

2.3.1 The Stock Exchange of Hong Kong (SEHK)

2.3.1.1 The Role and Responsibilities of SEHK in ESG Reporting

SEHK serves as a pivotal institution in driving the adoption of Environmental, Social, and Governance (ESG) reporting in Hong Kong. As the primary securities market regulator, SEHK is tasked with setting the frameworks, policies, and standards that govern ESG reporting for listed companies. Over the past decade, SEHK has progressively shifted its ESG reporting requirements from voluntary recommendations to mandatory disclosures, reflecting the growing emphasis on sustainability in global markets (HKEX 2015; HKEX 2019; HKEX 2024) This section examines SEHK's responsibilities, its evolving role in shaping ESG reporting, and the scope of its regulatory framework.

The SEHK's responsibilities in ESG reporting are multifaceted, encompassing the development of regulatory frameworks, enforcement of disclosure requirements, and the provision of guidance to listed companies. These responsibilities are aligned with its broader mandate to ensure market transparency, integrity, and investor protection.

SEHK is responsible for establishing and updating the ESG Reporting Guide, which serves as the foundation for ESG disclosures in Hong Kong. The guide is designed to provide listed companies with a structured framework for reporting on their environmental, social, and governance performance. Key responsibilities include

defining reporting standards, periodic updates and global alignment. In terms of reporting standards, SEHK sets clear and consistent standards for ESG disclosures, ensuring that companies report on material issues in a transparent and comparable manner. The ESG Reporting Guide is revised periodically to align with international best practices and address emerging sustainability challenges. For example, significant updates in 2016 and 2020 introduced mandatory governance disclosures and climate-related reporting. Lastly, SEHK ensures that its ESG guidelines are aligned with global frameworks, such as the Task Force on Climate-Related Financial Disclosures (TCFD) and the International Sustainability Standards Board (ISSB), to enhance the comparability of Hong Kong-listed companies' disclosures with those of their global counterparts.

SEHK enforces compliance with its ESG reporting requirements through a "comply or explain" mechanism, which requires companies to either disclose the relevant ESG information or provide a rationale for non-disclosure. The introduction of Mandatory Disclosure Requirements (MDRs) in 2020 further strengthened this oversight by requiring companies to disclose the governance structure overseeing ESG matters, the board's role in managing ESG risks and opportunities and reporting principles, including the scope and boundaries of the ESG report. By enforcing these requirements, SEHK ensures that listed companies are held accountable for their ESG performance, fostering greater transparency and trust among investors and stakeholders.

SEHK recognizes that effective ESG reporting requires companies to possess the necessary knowledge, skills, and resources. To support this, SEHK provides guidance materials including FAQs, best practice recommendations, and templates to assist

companies in preparing ESG reports and training programs including workshops, webinars, and industry-specific training sessions to enhance corporate understanding of ESG principles and reporting requirements. SEHK also tailored guidance for industries with unique sustainability challenges, such as real estate, transportation, and energy. Through these initiatives, SEHK ensures that companies, particularly small and medium-sized enterprises (SMEs), have the capacity to meet reporting expectations.

2.3.1.2 SEHK's Evolving ESG Reporting Requirements

Over the years, SEHK has played an increasingly proactive role in driving ESG reporting in Hong Kong. This evolution reflects the growing recognition of ESG factors as critical to corporate governance, risk management, and long-term value creation.

SEHK's ESG Reporting Guide was first introduced in 2012 as a voluntary framework to encourage listed companies to disclose their sustainability practices. However, the voluntary nature of the guide led to inconsistent reporting and limited adoption. Recognizing the need for greater accountability, SEHK progressively tightened its requirements:

- **2016:** The “comply or explain” approach was introduced, requiring companies to disclose ESG information or provide a valid explanation for non-disclosure.
- **2020:** Mandatory Disclosure Requirements (MDRs) were implemented, making governance and climate-related disclosures compulsory.
- **2023–2025:** SEHK began aligning its requirements with the International Sustainability Standards Board (ISSB) standards, including IFRS S1 (General Requirements for Sustainability-Related Disclosures) and IFRS S2 (Climate-Related Disclosures).

This progression underscores SEHK's commitment to enhancing the quality and

comparability of ESG disclosures in Hong Kong. One of SEHK's key roles has been to integrate climate-related risk management into corporate reporting. By aligning its guidelines with the TCFD framework, SEHK has ensured that companies disclose the governance structures in place for managing climate risks, the potential financial impacts of climate risks and opportunities on their business strategies and quantitative metrics, such as Scope 1, Scope 2, and, where applicable, Scope 3 GHG emissions. This focus on climate-related reporting reflects SEHK's broader objective of driving the transition to a low-carbon economy and addressing the risks posed by climate change.

SEHK's alignment with global ESG standards has positioned Hong Kong as a leader in sustainable finance. By adopting internationally recognized frameworks, such as ISSB and TCFD, SEHK ensures that Hong Kong-listed companies remain competitive in global capital markets. Furthermore, SEHK's proactive approach to ESG reporting has attracted responsible investors, reinforcing Hong Kong's status as a leading international financial hub.

2.3.2 The Securities and Futures Commission (SFC)

There are other regulatory authorities that oversee the ESG initiatives of the listed companies in Hong Kong. Securities and Futures Commission (SFC) is Hong Kong's securities regulator, responsible for regulating the securities and futures markets. The SFC has been actively promoting the integration of ESG considerations into the investment decision-making process. In 2021, the SFC issued the "Consultation Conclusions on the Management and Disclosure of Climate-related Risks by Asset

Managers", which set out new requirements for asset managers to manage and disclose climate-related risks. This new regulation requires asset managers to assess and disclose the climate-related risks and opportunities in their investment portfolios. Asset managers are required to make disclosures regarding their governance, investment and risk management processes in relation to climate-related risks. Similar to HKEX's listing rules requirement, they also need to disclose their Scope 1, Scope 2, and, where appropriate, Scope 3 greenhouse gas emissions. The reporting scope of SFC Requirements on Climate-related Disclosures focus on Climate-related risks and opportunities in the asset manager's investment portfolios with the recommendation to follow the Task Force on Climate-related Financial Disclosures (TCFD). The disclosure should be clear, comprehensive, and comparable.

2.3.3 The Hong Kong Monetary Authority (HKMA)

The Hong Kong Monetary Authority (HKMA), as Hong Kong's central banking institution, plays a crucial role in integrating sustainability into the financial system. The HKMA's initiatives are directed toward managing climate-related risks, promoting green investment, and positioning Hong Kong as a global hub for sustainable finance.

The Hong Kong Monetary Authority (HKMA) is the de facto central banking institution of Hong Kong, responsible for maintaining monetary and banking stability. Similar to HKEX and SFC, the HKMA has been working to promote sustainable banking and finance, including issuing guidance on climate risk management for banks. In 2020, the HKMA announced the launch of the Green and Sustainable Finance Cross-Agency Steering Group to coordinate the management of climate and environmental risks in the

financial sector.

The HKMA oversees authorized institutions (AIs), including banks and financial institutions, to ensure they incorporate ESG considerations into their operations and risk management frameworks. In recent years, the HKMA has introduced a number of policies to support this effort. In 2021, the HKMA issued the Supervisory Policy Manual (SPM) Module on Climate Risk Management, requiring banks to identify, measure, monitor, and mitigate climate-related risks on their credit, market, and operational risk profiles and incorporate climate considerations into stress testing and scenario analysis. The other area is on Green Lending and Investments. The HKMA encourages banks to increase their lending to green projects and integrate sustainability criteria into their investment portfolios. It also integrates ESG principles into the management of its Exchange Fund, which holds Hong Kong's foreign currency reserves. This includes allocating a portion of the fund to green bonds and other sustainable investments and aligning investment strategies with global sustainability goals, such as the Paris Agreement.

Overall, the Securities and Futures Commission (SFC) and the Hong Kong Monetary Authority (HKMA) play complementary roles in advancing ESG reporting and sustainable finance in Hong Kong. While the SFC focuses on regulating disclosures by market intermediaries and preventing greenwashing, the HKMA emphasizes climate risk management and the development of green finance markets. Together, these institutions are driving Hong Kong's transition to a sustainable financial system, addressing global challenges, and positioning the city as a leader in green and sustainable finance.

2.3.4 SZSE and SSE Reporting Guidelines

In addition to the ESG initiatives of the Hong Kong Stock Exchange (HKEX), the Shenzhen Stock Exchange (SZSE) and the Shanghai Stock Exchange (SSE), two key financial hubs in mainland China, have introduced comprehensive ESG guidelines to promote sustainable development and corporate responsibility. These guidelines align with international trends and reflect China's growing emphasis on sustainability and its "Dual Carbon Goals," which aim for carbon peaking by 2030 and carbon neutrality by 2060.

The Shenzhen Stock Exchange (SZSE) issued its "Guidelines for Social Responsibility of Listed Companies" in 2023, which emphasize corporate governance, environmental protection, and social responsibility. The guidelines require listed companies to disclose ESG-related information, focus on climate change, industry-specific reporting and stakeholder engagement. As regards ESG information, companies must provide detailed and transparent reports on their environmental, social, and governance performance. The emphasis is placed on quantitative metrics, such as carbon emissions, energy consumption, and water usage, together with qualitative disclosures like governance structures and risk management policies.

For climate change disclosure, the SZSE guidelines highlight climate-related risks and opportunities, encouraging listed companies to adopt strategies and investments that support China's carbon neutrality goals. SZSE guidelines also introduced tailored ESG disclosure requirements for high-impact industries, such as energy, manufacturing, and real estate, ensuring that sector-specific challenges are addressed. Lastly, companies

are encouraged to actively engage with stakeholders, including investors, employees, and communities, to align corporate goals with broader societal interests.

Similarly, the SSE has strengthened its "Corporate Social Responsibility Reporting Guidelines" as part of its commitment to advancing ESG integration among listed companies. From 2023 onwards, all SSE-listed companies are required to publish annual ESG reports, with specific KPIs aligned to global standards, such as the Global Reporting Initiative (GRI) and the Task Force on Climate-Related Financial Disclosures (TCFD).

The SSE guidelines emphasize the alignment of corporate activities with national initiatives like the Belt and Road Initiative and carbon neutrality targets. Companies are expected to report on how their operations contribute to these national goals. Companies must disclose detailed information about their board structure, oversight mechanisms for ESG matters, and the integration of ESG into strategic decision-making processes. To enhance the credibility of ESG disclosures, the SSE encourages listed companies to obtain independent assurance for their ESG reports.

These updated guidelines by the SZSE and SSE demonstrate the increasing regulatory focus on ESG in mainland China. By mandating comprehensive disclosures and aligning with international reporting frameworks, both exchanges aim to foster greater transparency, accountability, and sustainability among listed companies.

The ESG guidelines introduced by the SZSE and SSE, alongside the HKEX's ESG Reporting Guide, represent a significant step towards harmonizing ESG practices

across Greater China. While the HKEX has been a pioneer in mandatory ESG reporting, the SZSE and SSE are catching up by introducing robust frameworks that cater to both domestic and international stakeholders. These initiatives collectively enhance the region's reputation as a leader in sustainable finance and corporate governance.

By aligning with global standards and addressing critical issues like climate change, stakeholder engagement, and sector-specific challenges, the SZSE and SSE contribute to the broader discourse on sustainable development, offering valuable lessons for other emerging markets.

2.4 Benefits and Challenges of ESG Reporting

2.4.1 Importance of Effective ESG Reporting

Effective ESG reporting offers several benefits for companies, investors, and stakeholders. It will enhance transparency and accountability of the corporations. Comprehensive ESG reporting builds trust with stakeholders and demonstrates a company's commitment to sustainability. Secondly, it improved market competitiveness of the corporation with robust ESG practices are better positioned to attract capital, reduce the cost of borrowing, and differentiate themselves from competitors. In addition, ESG reporting enables companies to identify and mitigate environmental, social, and governance risks, enhancing long-term resilience. Lastly, transparent ESG disclosures meet investor demands for decision-useful information, fostering confidence in a company's sustainability practices.

ESG factors can significantly impact a company's operations, reputation, and firm performance. Comprehensive ESG reporting allows companies to identify, assess, and mitigate these risks, enhancing overall resilience. Both institutional and individual investors are increasingly incorporating ESG considerations into their investment decisions, favouring companies with strong performance and transparent reporting.

ESG reporting enables companies to communicate their sustainability efforts and impacts to a wide range of stakeholders, including customers, employees, regulators, and local communities, thereby enhancing transparency and building trust. Addressing ESG-related issues such as energy efficiency, waste reduction, and employee well-being can lead to cost savings and operational improvements. Companies that

proactively manage and report on their ESG performance can differentiate themselves from their peers, potentially gaining a competitive edge in the market.

As ESG importance grows globally, robust and transparent ESG reporting by listed companies in Hong Kong is becoming increasingly critical. This research study aims to explore the relationship between ESG disclosure, ESG performance, and financial performance of major listed companies in Hong Kong, providing valuable insights for corporations, investors, and regulatory authorities.

2.4.2 Challenges in ESG Reporting

Despite progress, companies in Hong Kong face several challenges in meeting ESG reporting requirements in the area of data collection and management as many companies lack robust systems for gathering, verifying, and consolidating ESG data. It is also difficult to conduct materiality assessment as identifying and prioritizing material ESG issues remains a subjective and complex process. SMEs, in particular, struggle with the financial and technical resources needed for effective ESG reporting. The absence of a universally accepted ESG reporting standard creates inconsistencies and limits comparability across companies. Obtaining independent assurance of ESG data is resource-intensive and requires specialized expertise.

There are challenges faced by companies in meeting ESG reporting requirements. In fact, gathering, verifying, and consolidating ESG data from various sources across the organization can be a significant challenge. Companies often lack robust data management systems and processes to ensure the reliability and consistency of ESG information. Identifying and prioritizing material ESG issues that are relevant to the

business and its stakeholders can be a complex and subjective process. Companies may struggle to balance the breadth of ESG topics and the depth of disclosure required. Many companies, especially smaller and medium-sized enterprises, lack the internal expertise, skills, and resources to effectively implement and maintain comprehensive ESG reporting. This can lead to difficulties in setting targets, developing strategies, and implementing ESG initiatives.

The lack of a single, universally accepted ESG reporting standard can make it challenging for companies to ensure the comparability and consistency of their disclosures. This can hinder benchmarking and limit the usefulness of ESG information for investors and other stakeholders. Obtaining independent assurance or verification of ESG data and disclosures can be resource-intensive and requires specialized expertise. Companies may face challenges in ensuring the reliability and credibility of their ESG reporting.

Some listed companies might find difficulties of integrating ESG considerations into corporate governance structures, decision-making processes, and executive compensation. Companies may struggle to balance the varying expectations and information requirements of different stakeholder groups. Collaboration with industry peers, regulators, and service providers can also help companies overcome these challenges. Hong Kong's implementation of mandatory ESG reporting requirements aligns with the UN's global push for greater corporate accountability and transparency.

By requiring listed companies to disclose their environmental, social, and governance performance, Hong Kong is taking a proactive step towards integrating sustainability

considerations into the heart of business decision-making and operations.

2.5 Internal and External Drivers of Hong Kong's ESG Guidelines

Hong Kong's ESG guidelines have been shaped by a combination of internal drivers (local market dynamics, regulatory initiatives, and corporate governance practices) and external drivers (global sustainability trends, international frameworks, and investor expectations).

Regarding the internal drivers, the HKEX has played a critical role in driving ESG adoption in Hong Kong. Since introducing its first ESG Reporting Guide in 2012, HKEX has progressively strengthened disclosure requirements. Key milestones include the shift to a "comply or explain" approach in 2016, mandatory disclosures of governance structure and climate-related risks in 2020, and alignment with the ISSB Climate Disclosures and TCFD framework in 2023.

The HKEX's leadership reflects its commitment to aligning Hong Kong with global best practices while addressing local market needs. For instance, the 2025 phased implementation of mandatory climate-related disclosures demonstrates HKEX's focus on balancing regulatory rigor with market readiness.

Another area of concern is the Corporate Governance and Board Accountability. Hong Kong's Corporate Governance Code emphasizes the role of boards in overseeing ESG issues. Companies are required to disclose their governance structure, the board's oversight of ESG matters, and how significant ESG risks are managed. This internal

governance focus ensures that ESG is integrated into strategic decision-making processes.

As a leading financial hub in Asia, Hong Kong must maintain its competitiveness by adopting globally recognized ESG practices. Hong Kong's reliance on international trade, investment, and financial services motivates its regulators and corporations to adopt robust ESG frameworks to attract global investors. Certain industries in Hong Kong, such as property development, transport, public utilities, and catering, face stringent ESG requirements due to their significant environmental and social impacts. These industries are key contributors to Hong Kong's economy and are under pressure to align with international sustainability goals.

Turning to external drivers, the global emphasis on climate change, sustainable development, and ESG integration has heavily influenced Hong Kong's ESG guidelines. International frameworks such as the UN SDGs, TCFD, and ISSB have provided a foundation for the HKEX's ESG Reporting Guide. The alignment of Hong Kong's guidelines with global standards ensures that Hong Kong-listed companies remain competitive in attracting international capital and meeting the expectations of global investors.

On the other hand, institutional investors, including signatories to the UN Principles for Responsible Investment (PRI), are increasingly demanding robust ESG disclosures. Investors view ESG factors as critical to assessing long-term financial performance and risk and they will refer to ESG performance in the decision-making process. The

growing popularity of green bonds, ESG-focused funds, and impact investing has further motivated companies to enhance their ESG transparency.

Climate change is another external driver for the ESG guidelines. Hong Kong has committed to achieving carbon neutrality by 2050. The HKEX's adoption of the TCFD framework and its alignment with ISSB standards reflect the city's response to international pressure to address climate-related risks. The Securities and Futures Commission (SFC) has also established climate-related disclosure requirements for asset managers, further embedding ESG into Hong Kong's regulatory landscape.

Lastly, peer influence and regional competition are another external driver. Hong Kong faces competition from other financial centres, such as Singapore, Tokyo, and Shanghai, which are also advancing their ESG agendas. To maintain its position as a leading financial hub, Hong Kong must meet or exceed the ESG standards set by its regional peers and continuous refinement in ESG reporting requirement is indispensable.

HKEX adopts a phased approach for the Implementation Guidance phases in the new climate disclosure requirements over two years, differentiating by issuer segment and by disclosure type. The reporting requirements for various issuers along with their corresponding effective dates are shown in Table 2.

For the large cap issuers, it is mandatory for disclose Scope 1 and Scope 2 GHG emissions information for financial years beginning on or after 1 January 2025. This means large caps must quantify and disclose their direct and indirect energy emissions starting from the 2025 reporting cycles. For main board issuers (other than Large Cap),

they have to disclose Scope 1 and Scope 2 GHG emissions information under “Comply or explain” for financial years beginning on or after 1 January 2025. These issuers are expected to disclose their emissions from 2025, or provide a clear rationale and plan if they cannot yet do so. They will follow the general phasing applicable to non-large caps, with the expectation to move toward alignment but without solid mandatory date in 2025. For GEM Issuers they are voluntary to disclose Scope 1 and Scope 2 GHG emissions for financial years beginning on or after 1 January 2025. GEM companies are encouraged—but not required—to begin reporting emissions from 2025. They are also voluntary at this stage to disclose other climate disclosure information under the 2024 guidance, allowing GEM issuers more time to build capacity before mandatory adoption.

Table 2: Disclosure Obligations and Effective Dates for the New Climate Requirements

	New Climate Requirements effective date	
	Scope 1 and Scope2 GHG emissions	Other New Climate Requirements
Large Cap Issuers	Mandatory Financial years commencing on or after 1 Jan 2025	Comply or explain Financial years commencing on or after 1 Jan 2025 Mandatory Financial years commencing on or after 1 Jan 2026
Main Board Issuers (Other than Large Cap Issuers)		Comply or explain Financial years commencing on or after 1 Jan 2025
GEM Issuers		Voluntary Financial years commencing on or after 1 Jan 2025

Source: Implementation Guidance for Climate Disclosures under HKEX ESG reporting 2024

In summary, large caps face the fastest and firmest timetable: emissions disclosures are mandatory from FY2025, and all other climate disclosures become mandatory from FY2026 after a one-year comply-or-explain transition. Other Main Board issuers begin with a comply-or-explain obligation on emissions from FY2025, while GEM issuers have a voluntary pathway starting the same year. The staggered approach is designed to balance investor needs for decision-useful climate information with issuers' varying readiness levels. The progression schedule is illustrated in Table 2.

2.6 Key Differences between Hong Kong and Global ESG Reporting Requirements

The differences in ESG disclosure requirements between Hong Kong and global frameworks stem from several factors, including market maturity, regulatory philosophy, stakeholder expectations, and cultural and economic contexts. These factors reflect the unique characteristics of Hong Kong's financial ecosystem and its alignment with regional priorities, contrasting with the broader, more standardized global frameworks.

2.6.1 Market Maturity

Hong Kong's ESG disclosure framework reflects its status as a leading financial hub in Asia, with a high concentration of regional and international businesses. The Hong Kong Stock Exchange (HKEX) has tailored its ESG requirements to meet the needs of a diverse business landscape, where companies vary significantly in their size and ESG maturity. Unlike regions such as the European Union, which have longstanding sustainability policies and advanced ESG ecosystems, Hong Kong's ESG regulations are still evolving to support a growing emphasis on corporate sustainability. For instance, the HKEX ESG Reporting Guide, introduced in 2016 and enhanced in 2020, emphasizes gradual adoption and flexibility (HKEX, 2020). This contrasts with mandatory, detailed reporting under frameworks like the EU's Corporate Sustainability Reporting Directive (CSRD), which targets a more mature ESG market.

2.6.2 Regulatory Philosophy

Hong Kong's regulatory approach is designed to balance oversight with flexibility, ensuring that businesses remain competitive while adhering to ESG principles. The HKEX guidelines mandate ESG disclosures for listed companies but avoid overly prescriptive requirements, allowing companies to tailor their reports according to their operations. This aligns with Hong Kong's goal of attracting international firms by maintaining a business-friendly environment. In contrast, global frameworks like the GRI and TCFD often impose more stringent and standardized reporting obligations to ensure consistency and comparability (GRI, 2023; TCFD, 2021). For example, the TCFD requires detailed disclosures on climate-related financial risks, which may be challenging for smaller or less-resourced firms in Hong Kong to adopt fully.

2.6.3 Stakeholders Expectations

The focus of ESG disclosures in Hong Kong is more investor-centric, emphasizing financial materiality over broader societal impacts. This contrasts with global frameworks, such as GRI, which incorporate "double materiality" by requiring companies to disclose not only how ESG factors affect their financial performance but also their impact on the environment and society (GRI, 2023). Hong Kong's investor-driven approach reflects its role as a gateway for capital into Mainland China and the wider Asia-Pacific region, where financial returns often take precedence over broader ESG goals.

2.6.4 Cultural and Economic Context

Hong Kong's regulatory framework is heavily influenced by its integration with Mainland China, where ESG policies are still maturing. As a result, Hong Kong's ESG disclosures often align with regional priorities, such as addressing climate-related risks and promoting corporate governance, while global standards tend to incorporate broader Western perspectives on sustainability. For example, the EU's ESG policies are deeply rooted in global climate agreements like the Paris Accord and sustainable development goals, which have shaped the stringent nature of their frameworks (European Commission, 2023). Hong Kong's approach, by contrast, reflects a balance between global aspirations and regional realities.

In summary, the differences between Hong Kong and global ESG disclosure standards arise from their unique regulatory, economic, and cultural contexts. While Hong Kong prioritizes flexibility and investor-focused reporting, global frameworks aim for standardization and broader stakeholder inclusivity. These variations underscore the importance of tailoring ESG regulations to local realities while striving for greater alignment in the future.

2.7 Chapter Summary

This chapter provides an introduction to the evolution of ESG reporting and its growing significance in the global business and regulatory landscape. It sets the foundation for the subsequent themes explored in the chapter. It explored the evolution of ESG disclosure requirements in Hong Kong, emphasizing the internal and external drivers

that have shaped ESG guidelines. The chapter traces the transition from voluntary CSR initiatives to the structured and measurable ESG framework. It highlights the drivers behind this shift, including societal expectations, regulatory pressures, and the growing recognition of ESG as a driver of long-term value creation.

CHAPTER THREE

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

3.1 Introduction

The intricate relationship between environmental, social, and governance performance and financial outcomes has become a focal point in contemporary corporate research. While various theories attempt to explain this relationship, there are conflicting ideas on which theories are more convincing to explain the relationship between ESG and firm performance. The evolving landscape of corporate sustainability has prompted researchers to delve deeper into the potential links between ESG factors and financial outcomes. By effectively managing ESG-related risks, fostering strong stakeholder relationships, and capitalizing on ESG-driven business opportunities, companies can potentially enhance their firm performance. (HKEX 2020, 2023).

Empirical studies exploring the ESG-firm performance link have yielded diverse results, reflecting the complexity of this relationship. Some studies, such as those conducted by Friede et al. (2015) and Eccles et al. (2014), have identified a positive correlation, suggesting that robust ESG practices can lead to superior financial outcomes. These studies attribute this positive relationship to improved operational efficiency, enhanced risk management, and better access to capital.

Conversely, other studies have reported neutral or negative relationships between ESG and financial performance (Brammer et al., 2006; Barnett & Salomon, 2012). These findings highlight the potential trade-offs and costs associated with implementing ESG initiatives, as well as the challenges in accurately measuring and valuing ESG performance and practices.

Recent research has sought to reconcile these conflicting results by examining boundary conditions and contingency factors that may influence the ESG-financial performance relationship. Studies by Trumpp and Guenther (2017) and Oikonomou et al. (2012) have explored how factors such as industry, firm size, and corporate governance may moderate this complex relationship.

This chapter will delve into empirical studies that have explored the ESG-firm performance link, revealing a spectrum of outcomes including positive, neutral, and negative relationships. We will examine these diverse findings to provide a nuanced understanding of the factors that may influence this complex relationship, including industry-specific considerations, firm size, and governance structures.

By critically analysing both theoretical frameworks and empirical evidence, this literature review aims to provide a comprehensive overview of the current state of knowledge regarding the impact of ESG performance on financial outcomes, setting the stage for further research and practical applications in corporate strategy and policy-making.

3.2 Theoretical Foundations

3.2.1 Introduction

This section sets out the theoretical framework that underpins the study's examination of the ESG–performance relationship. It establishes a clear narrative that guides how the study interprets ESG practices, disclosure, and outcomes through four complementary lenses: stakeholder theory, agency theory, legitimacy theory, and signalling theory. First, it explains why multiple theories are necessary for a robust understanding of ESG in practice. It then positions stakeholder theory as the primary value-creation lens, followed by agency theory to address incentive alignment and information asymmetry. Legitimacy theory is also discussed to consider societal expectations, and signalling theory is reviewed to explain how markets interpret disclosure. The section closes by integrating these perspectives into a coherent logic that informs the constructs, variables, and hypotheses used in this thesis.

3.2.2 Stakeholder theory

Stakeholder theory encompasses a wide range of entities beyond shareholders, including managers, creditors, customers, suppliers, employees, governments, and other interest groups (Roy and Goll, 2014; Gallego-Alvarez and Ortas, 2017). This inclusive approach extends to institutions and societies at large (Mitchell et al., 1997). The theory posits that by addressing stakeholder concerns, organizations can generate substantial benefits. For instance, companies focusing on environmental aspects are better equipped to manage environmental risks and drive innovations in renewable

energy, potentially leading to competitive advantages and improved financial performance (Hart, 1995).

The stakeholder approach has introduced a paradigm shift in management thinking, suggesting that shareholder needs cannot be fully met without addressing the needs of other stakeholders (Foster and Jonker, 2005; Hawkins, 2006; Jamali, 2008; Parmar et al., 2010). This shift has expanded corporate goals beyond mere profit maximization to include socially and environmentally sustainable practices (Longo et al., 2005). The theory emphasizes the importance of ethical and honest interactions with all stakeholders (Donaldson and Preston, 1995; Jones, 1995; Vasconcelos et al., 2012).

In the context of sustainability, stakeholder theory provides a crucial framework for understanding how companies should meet stakeholders' information needs (Chen and Roberts, 2010; Smith et al., 2005). It enables business leaders to address growing concerns about sustainable development and communicate their contributions to societal well-being (Chen and Roberts, 2010). This approach necessitates that companies improve their economic, social, and environmental performance while maintaining transparency with stakeholders.

The theory advocates for value creation for all stakeholders (Freeman, 2010), with Corporate Social Responsibility (CSR) reporting serving as a vital tool for stakeholder dialogue. Companies utilize social and environmental reporting to engage openly with stakeholders, addressing their concerns and contributions (Gray et al., 1995; Preston and Donaldson, 1999). This engagement can lead to improved environmental, social, and economic outcomes (Arayssi et al., 2016).

The theory is commonly analysed through three interconnected lenses: descriptive, instrumental, and normative (Donaldson & Preston 1995; Jones 1995). The descriptive lens examines how managers perceive and respond to stakeholder needs and corporate values. The instrumental lens focuses on the outcomes of meeting those needs, while the normative lens explores the capability of managers to establish an ethical corporate framework. Effective stakeholder management involves identifying, prioritizing, and understanding the interests of various stakeholder groups from these perspectives.

In summary, stakeholder theory provides a comprehensive framework for understanding the complex interplay between corporate governance, ESG practices, and firm performance (Donaldson & Preston 1995; Freeman 1984; Freeman et al. 2010). It challenges traditional notions of corporate responsibility and offers a more holistic approach to business management, aligning closely with the principles of sustainable development and responsible business practices.

3.2.3 Agency Theory

Agency theory, developed by Jensen and Meckling (1976), focuses on the potential conflicts of interest between principals (shareholders) and agents (managers). In the ESG context, this theory suggests that ESG disclosures can reduce information asymmetry between managers and shareholders. Strong ESG performance may indicate effective management and lower agency costs. Governance mechanisms can align manager interests with those of shareholders, potentially improving firm performance (Shleifer and Vishny, 1997).

Agency theory provides a crucial framework for understanding the complex dynamics between corporate management and shareholders, particularly in the context of ESG initiatives. The theory seeks to analyse these conflicts and develop mechanisms to mitigate them, ensuring alignment between managerial actions and shareholder value. For example, companies with robust governance and internal control systems are better positioned to conduct thorough oversight and audit activities through their boards (Carter et al., 2003). This enhanced governance structure can potentially reduce agency conflicts and positively impact both financial and non-financial firm performance (Erhardt et al., 2003).

However, the application of agency theory to ESG activities introduces additional complexities. Barnea and Rubin (2010) and Borghesi et al. (2014), for example, argued that managers might over-invest in ESG initiatives to build personal reputations as good corporate citizens, potentially at the expense of shareholder returns. Kao et al. (2018) further investigated how managerial incentives influence corporate social responsibility (CSR) decisions, finding that equity-based compensation can help align manager and shareholder interests in ESG contexts. Bao et al. (2018) suggests that ESG initiatives can create long-term value for shareholders by improving stakeholder relationships, enhancing reputation, and mitigating risks. By adopting this refined framework, organizations can balance the short-term costs of ESG initiatives with their long-term benefits, aligning managerial actions with holistic shareholder interests.

In summary, while agency theory highlights potential conflicts between managers and shareholders in ESG contexts, it also provides a framework for developing governance mechanisms that can align these interests (Jensen & Meckling 1976). As ESG

considerations become increasingly central to corporate strategy, a refined understanding of agency theory that accommodates both financial and non-financial performance metrics will be crucial for effective corporate governance.

3.2.4 Legitimacy Theory and Signalling Theory

Legitimacy theory is considered one of the most common theories in the disclosure literature (Campbell et al., 2003; Deegan 2002; Zamil et al., 2021). Legitimacy theory, as described by Suchman (1995), posits that organizations continually seek to ensure that they operate within the bounds and norms of their respective societies. In relation to ESG, ESG disclosures can be seen as a tool for maintaining organizational legitimacy. Strong ESG performance may enhance a company's social license to operate (Khan, M., Serafeim, G. and Yoon, A. (2016)). Firms may engage in ESG activities to conform to societal expectations and avoid reputational risks. Legitimacy theory states that firms must act in accordance with social values and norms in order to maintain their current existence (Dowling and Pfeffer, 1975). First, the basis of legitimacy theory lies on a "social contract" between business and society. It is believed that society provides business with the means and environment to survive and in return, business is committed to run its activities. Second, the public considered that supporting a business means ensuring that corporation will act in line with society's values and standards. When societal expectations are not fulfilled, and the company's actual or perceived behaviour is inconsistent with societal values and norms, there will be divergent views on business in the society (Suchman, M.C. (1995))

As far as the theory of legitimacy is concerned, companies in certain industries such as

public utilities and transport are more socially visible in the eyes of the public and the government. These companies are under considerable social and political pressure to operate in a highly socially acceptable manner and more inclined to provide ESG-related information (Matten and Moon, 2008).

The Signalling Theory is quite similar to the legitimacy theory as it suggests that one of the main goals of the Company is to deliver a “signal” to external parties regarding the goodwill of the companies. According to Caesaria and Basuki 2017, the goodwill can be shown by disclosing information related to the companies’ sustainable development. According to signalling theory, companies with good news to disclosure tend to provide more information (signals) to outsiders to differentiate themselves from other bad news of companies (Connelly, et al., 2011). According to Razaee and Tuo (2017), firms signal their good news and performance by releasing ESG reports to distinguish themselves from their competitors. While signalling theory focus on positive signals that the company will give to information users, it does not explain the effect of unintentional negative signals (Connelly et al., 2011).

3.2.5 Stakeholder Theory as the Research Framework

The evolution of corporate responsibility has given rise to various theories explaining the relationship between businesses and society. Among these, stakeholder theory has emerged as a key framework for understanding the complex link between ESG practices, and firm performance. Unlike other theories, stakeholder theory offers a holistic approach by integrating multiple perspectives while addressing the broader responsibilities of businesses in society.

Stakeholder theory differs from agency theory (Ross, 1973; Jensen & Meckling, 1976), which focuses on the principal-agent relationship between shareholders and management. While agency theory prioritizes shareholder wealth maximization, stakeholder theory expands this scope to recognize the interests of all stakeholders. This shift moves the corporate responsibility narrative from a narrow focus on financial returns to a wider emphasis on social equity, environmental stewardship, and long-term value creation.

Legitimacy theory stresses the importance of ESG disclosure for maintaining a company's "social license to operate," helping to avoid negative repercussions. (Suchman 1995; Deegan 2002). However, it tends to be reactive, mainly addressing risk mitigation. In contrast, stakeholder theory advocates for proactive engagement with stakeholders, encouraging companies to create value by aligning their strategies with stakeholder interests through effective ESG management.

Signalling theory emphasises ESG disclosures as a means to attract socially responsible investors but primarily focuses on capital markets. Stakeholder theory, however, provides a broader perspective by considering the diverse interests of all stakeholders, including employees, communities, and regulators. This comprehensive approach allows companies to better align their ESG practices with stakeholder expectations, leading to more sustainable results (Porter & Kramer 2011; Eccles, Ioannou & Serafeim 2014).

3.3 ESG Disclosure and Firm Performance

The motivations behind ESG reporting are multifaceted and often strategic. The voluntary disclosure theory, proposed by Verrecchia (1983) and Dye (1985), suggests that companies with positive ESG performance are more likely to report their activities in detail, while those with negative performance may disclose less. This theory aligns with the concept of signalling, where companies use ESG reporting to differentiate themselves from poor performers and potentially lower their cost of capital (Akerlof, 1970).

However, the relationship between ESG performance and disclosure is not always straightforward. Companies may use ESG reporting as a reputation management tool, increasing disclosure in response to negative events or to restore legitimacy (Brown & Deegan, 1998; Cho & Patten, 2007). The phenomenon of "greenwashing" – where companies present themselves as more ESG-conscious than they actually are – further complicates the landscape of ESG reporting.

Interestingly, some companies with positive ESG performance may choose to underreport their activities, a practice known as "excessive modesty" or "whitewashing" (Kim & Lyon, 2015). This counterintuitive approach may stem from concerns that ESG investments could be perceived as cost-inefficient by certain stakeholders. While this study does not directly investigate the impact of ESG disclosure on ESG performance, understanding the interplay between these factors is crucial for contextualizing our research.

Empirical studies have produced a spectrum of results regarding the nature of the ESG performance-disclosure relationship. Early research by Freedman & Wasley (1990), Ingram & Frazier (1980), and Wiseman (1982) found no clear correlation between companies' ESG performance and the robustness of their ESG disclosures. This lack of a definitive relationship suggests that high-performing companies in ESG matters do not necessarily provide more comprehensive disclosures, and vice versa.

Intriguingly, some studies have reported a negative correlation between environmental performance and environmental disclosure (Hughes, Anderson and Golden, 2001; Patten, 2002). This counterintuitive finding might indicate that companies with poorer environmental performance may engage in more extensive disclosure as a form of legitimacy management or to pre-empt stakeholder concerns.

However, more recent research has painted a different picture. Studies by Gelb and Strawser (2001), Al-Tuwaijri et al. (2004), Clarkson et al. (2008, 2011), Dhaliwal et al. (2011), Lyon and Maxwell (2011), and Gao et al. (2016) have reported positive correlations between ESG performance and disclosure. These findings suggest that companies with stronger ESG performance may be more inclined to disclose their activities, possibly to signal their superiority or to capitalize on their positive performance.

The inconsistency in these results can be attributed to several factors. First, methodological issues regarding imperfect or inappropriate research methods may lead to conflicting outcomes. Second, the measurement challenges leading to difficulties in accurately quantifying both ESG performance and the extent of ESG disclosure can

skew results. Third, the sample selection bias regarding choice of companies or industries studied can significantly impact findings. Lastly, insufficient control for relevant factors resulting in failure to account for important variables may lead to misleading correlations.

Clarkson et al. (2008) noted that some elements within the disclosure indices used in these studies are ambiguous, which makes interpretation the results more difficult. The observed negative relationship between ESG performance and disclosure in some studies could potentially be explained by increased disclosure requirements stemming from emerging environmental issues, rather than reflecting a true inverse relationship between performance and transparency.

It is worth noting that the relevance of ESG disclosures themselves remains a topic of debate, with earlier literature reviews (Kouhy and Lavers, 1995) indicating inconclusive evidence on their significance to stakeholders. This diverse body of empirical evidence underscores the complexity of the ESG performance-disclosure relationship. It highlights the need for nuanced interpretation of ESG disclosures and cautions against simplistic assumptions about the relationship between a company's ESG performance and its disclosure practices.

3.4 ESG and Financial Performance

Environmental, Social, and Governance (ESG) performance has become a central consideration in assessing corporate sustainability and long-term value creation. ESG encompasses a company's management of environmental impacts, social

responsibilities, and governance structures—ranging from carbon footprint reduction and diversity initiatives to board oversight and ethical conduct. The literature, however, reflects an ongoing debate regarding the direction and magnitude of the ESG-firm performance relationship.

Researchers have proposed several pathways by which ESG activities may enhance firm value. These include attracting socially conscious consumers, improving employee engagement, reducing operational risks, and lowering the cost of capital. Investors may also perceive high ESG performers as more resilient and better managed, supporting higher valuations even if short-term cash flows are similar to less responsible firms.

At the heart of this debate is the question of causality: Does strong ESG performance drive superior financial outcomes, or do financially robust firms simply have greater capacity to invest in ESG initiatives? Theoretical perspectives suggest multiple value-creation mechanisms. For instance, ESG efforts can enhance revenue through customer loyalty and operational efficiency via resource optimization and employee productivity gains. Investors may also value the intangible benefits of responsible ownership, potentially leading to lower costs of capital and improved risk profiles.

Empirical results are diverse. For example, Friede, Busch, and Bassen (2015) synthesized over 2,000 studies and found that roughly 90% reported non-negative, and a majority positive, relationships between ESG and financial performance. Yet, these findings often depend on research design, measurement approach, and time horizon. Causality, selection bias, and the multidimensional nature of ESG further complicate the picture. Advanced econometric techniques—such as difference-in-differences,

instrumental variables, and matched samples—tend to find smaller but more credible effects, primarily in risk reduction and cost of capital rather than immediate profitability. Overall, while the majority of evidence suggests a positive or neutral association between ESG and financial outcomes, inconsistencies in methodologies and contexts warrant cautious interpretation. Future research should prioritize robust identification strategies, standardized metrics, and longer-term analysis to clarify the mechanisms at play.

3.4.1 Positive Effects

A substantial body of research has found positive links between ESG performance and financial metrics. Studies by Gillan et al. (2010) and Borghesi et al. (2014) demonstrated that firms with higher ESG ratings tend to have higher market valuations (e.g., Tobin's Q) and improved operational performance. Ferrell, Liang, and Renneboog (2016) also found that improvements in ESG can enhance firm value and moderate negative effects associated with managerial entrenchment.

Other research has identified channels through which ESG creates value, such as greater returns among firms with high advertising expenditures (Servaes & Tamayo, 2013; Albuquerque et al., 2018), and lower cost of capital for companies with high ESG ratings (Hong & Kacperczyk, 2009; Amiraslani et al., 2017). Flammer (2015; 2020) and Tang and Chang (2018) provided evidence that positive ESG events—including green bond issuance—are associated with favourable stock market reactions and subsequent operational improvements.

Positive event studies abound: Dimson, Karakaş, and Li (2015) reported gains from ESG engagements; Edmans (2011) and Cornett, Erhemjamts, and Tehranian (2016) found superior returns during low-trust periods; Statman and Glushkov (2009) and Barko, Cremers, and Renneboog (2018) linked high ratings to outperformance; Krüger (2015) and Flammer (2015) noted positive reactions to ESG proposals; and Deng, Kang, and Low (2013), Tang and Zhang (2018), and Flammer (2020) observed favourable responses to mergers and green bond issuances.

Taken together, these findings support the argument that ESG can enhance firm value—especially when initiatives align with business strategy, stakeholder expectations, and are effectively communicated.

3.4.2 Ambiguous or No Effect

Some empirical evidence finds little to no relationship between ESG activities and financial outcomes. For example, Hsu, Liang, and Matos (2018) found that environmental choices among state-owned enterprises did not significantly correlate with shareholder value or long-term profitability. Similarly, Humphrey, Lee, and Shen (2012), analysing UK companies, concluded that corporate social performance ratings had no significant association with risk-adjusted returns.

These studies suggest that, at least in certain contexts or for particular firms, ESG initiatives can be implemented without substantial financial cost or benefit. The absence of consistent effects underscores the complexity of the ESG-performance nexus and the influence of contextual variables such as ownership structure, geography, and

measurement approaches.

3.4.3 Negative Effects

Despite the growing consensus on the potential benefits of ESG, a strand of research highlights possible negative or unintended consequences. Some studies suggest that ESG initiatives may be more a result of financial success than a cause. For instance, Hong, Kubik, and Sheinkman (2012) found that firms with ample financial resources tend to increase ESG activities following positive performance shocks, implying reverse causality.

Other research has identified direct negative associations. Di Giuli and Kostovetsky (2014) reported that changes in ESG scores were not significantly related to sales growth, and even negatively correlated with changes in Return on Assets (ROA) and stock returns. Similarly, Buchanan, Cao, and Chen (2018) observed that during the 2008 financial crisis, firms with higher ESG scores experienced greater declines in enterprise value—suggesting that over-investment in ESG may have left them more vulnerable during economic downturns.

Other studies reinforce these findings: Masulis and Reza (2015) observed negative market reactions to charitable giving announcements, implying investors view certain ESG activities as value-destroying. Servaes and Tamayo (2013) noted that ESG's impact on firm value depends on advertising intensity, with no significant effects in low-advertising firms, highlighting conditional drawbacks.

Collectively, these findings caution that ESG initiatives do not guarantee improved financial performance and, under certain conditions, may even detract from shareholder value. The context, type of ESG activity, and firm-specific factors must be considered in assessing potential financial impacts.

These findings underscore the need for a more nuanced approach to ESG strategy and evaluation. While ESG activities can provide various benefits, companies and investors should consider the specific context of the firm, including its financial constraints and market position, the types of ESG activities that are most relevant and impactful for their industry and stakeholders, the potential short-term costs versus long-term benefits of ESG initiatives and the importance of effective communication and transparency in ESG reporting to align investor expectations with corporate strategy.

As the field of ESG research continues to evolve, these critical perspectives serve as important counterpoints to more optimistic views, encouraging a balanced and context-specific approach to ESG strategy and implementation. Future research should aim to further disentangle the complex causal relationships between ESG activities, firm performance, and institutional factors to provide more targeted guidance for corporate decision-making and investor assessment.

3.4.4 Characteristics of Studies Showing Positive or Negative Correlations

Table 3 presents the common characteristics observed in studies showing positive and negative correlations between ESG (Environmental, Social, and Governance) factors and financial performance. By analysing these characteristics across six dimensions—

time horizon, industry focus, ESG materiality, geographic context, measurement and methodology, and stakeholder engagement—the table offers critical insights into the factors that influence the outcomes of ESG-related studies.

Table 3 Common Characteristics between Studies with Positive and Negative Relations

Characteristic	Studies with Positive Correlation	Studies with Negative Correlation
Time Horizon	Longer time horizons (e.g., Friede et al., 2015; Eccles et al., 2014).	Shorter time horizons or event-driven studies (e.g., Di Giuli & Kostovetsky, 2014).
Industry Focus	High-visibility or environmentally sensitive industries (e.g., energy, manufacturing, financial services).	Industries with lower stakeholder pressure or low ESG materiality (e.g., state-owned enterprises).
ESG Materiality	Focus on material ESG issues relevant to the industry or region (Khan et al., 2016).	Inclusion of immaterial ESG factors, diluting financial impact (Barnett & Salomon, 2012).
Geographic Context	Developed markets with strong stakeholder awareness (e.g., U.S., Europe).	Emerging markets or regions with weak regulatory enforcement and investor awareness (e.g., Hsu et al., 2018).
Measurement and Methodology	Robust ESG metrics and control for endogeneity (e.g., Clarkson et al., 2011).	Simplistic or incomplete ESG metrics and lack of control for confounding factors (e.g., Brammer et al., 2006).
Stakeholder Engagement	High stakeholder involvement and awareness (e.g., Gillan et al., 2021).	Low stakeholder pressure or lack of awareness (e.g., Humphrey et al., 2012).

3.4.4.1 Time Horizon

Positive Correlation (Longer Time Horizons): Studies such as Friede et al. (2015) and Eccles et al. (2014) emphasize the importance of long-term perspectives in capturing the financial benefits of ESG investments. This is because ESG initiatives often require

time to yield measurable outcomes, such as improved operational efficiency, enhanced brand reputation, or reduced risks.

Negative Correlation (Shorter Time Horizons): On the other hand, studies with shorter timeframes or event-driven analyses, such as Di Giuli & Kostovetsky (2014), tend to show negative correlations. These studies may fail to capture the long-term benefits of ESG efforts, focusing instead on short-term costs or immediate market reactions, which can obscure the overall value of ESG investments.

The time horizon is a critical determinant of whether ESG efforts are perceived as value-enhancing or cost-incurring. Longer horizons allow the materialization of ESG benefits, while shorter horizons may highlight initial implementation costs or market scepticism.

3.4.4.2 Industry Focus

Positive Correlation (High-Visibility or Environmentally Sensitive Industries): Studies showing positive correlations often focus on industries such as energy, manufacturing, and financial services, where stakeholder scrutiny and ESG materiality are high. For these industries, proactive ESG practices can reduce regulatory risks, enhance reputation, and drive competitive advantages.

Negative Correlation (Industries with Lower Stakeholder Pressure): Conversely, industries with lower stakeholder pressure or low ESG materiality, such as state-owned enterprises, often exhibit negative correlations. These sectors may lack the external

incentives or competitive pressures required to prioritize ESG investments, leading to suboptimal financial outcomes.

The industry context plays a pivotal role in determining the financial impact of ESG practices. ESG efforts are more likely to yield positive financial outcomes in industries where stakeholder pressure and ESG materiality are higher.

3.4.4.3 ESG Materiality

Positive Correlation (Focus on Material ESG Issues): Studies such as Khan et al. (2016) highlight the importance of focusing on material ESG issues—those that are most relevant to a given industry or region. Addressing material ESG factors can have a direct and measurable impact on financial performance, as they align closely with the company's core business activities.

Negative Correlation (Inclusion of Immaterial ESG Factors): Studies that include immaterial ESG factors, such as Barnett & Salomon (2012), often dilute the financial impact of ESG efforts. Immaterial factors may incur costs without delivering significant benefits, leading to weaker or negative correlations.

The financial success of ESG initiatives depends on their materiality. Companies and studies must prioritize ESG factors that are directly relevant to their industry or region to maximize financial and sustainability outcomes.

3.4.4.4 Geographic Context

Positive Correlation (Developed Markets): Studies conducted in developed markets such as the U.S. and Europe often show positive correlations due to stronger stakeholder awareness, regulatory frameworks, and investor demand for ESG transparency. These factors encourage companies to adopt ESG practices that enhance both sustainability and financial performance.

Negative Correlation (Emerging Markets): In contrast, studies focusing on emerging markets, such as Hsu et al. (2018), frequently reveal negative correlations. Weak regulatory enforcement, limited investor awareness, and lower stakeholder pressure in these regions often undermine the financial benefits of ESG initiatives.

Geographic context significantly shapes ESG outcomes. Developed markets provide a more conducive environment for ESG efforts to succeed, whereas emerging markets face structural challenges that limit the effectiveness of ESG practices.

3.4.4.5 Measurement and Methodology

Positive Correlation (Robust Metrics and Controls): Studies such as Clarkson et al. (2011) demonstrate that robust ESG metrics, combined with controls for endogeneity and confounding factors, are more likely to show positive correlations. Accurate measurement and comprehensive methodologies ensure that the true impact of ESG practices is captured.

Negative Correlation (Simplistic or Incomplete Metrics): On the other hand, studies with simplistic or incomplete ESG metrics, such as Brammer et al. (2006), often fail to account for key variables, leading to negative or inconclusive results.

The quality of measurement and methodology is critical for deriving meaningful insights from ESG research. Robust, well-designed studies are more likely to demonstrate the positive financial impact of ESG efforts.

3.4.4.6. Stakeholder Engagement

Positive Correlation (High Stakeholder Involvement): Research by Gillan et al. (2021) highlights that high levels of stakeholder involvement and awareness can drive positive ESG outcomes. Active engagement with stakeholders ensures that ESG initiatives align with societal expectations, enhancing their financial and reputational value.

Negative Correlation (Low Stakeholder Pressure): Studies such as Humphrey et al. (2012) indicate that low stakeholder pressure or lack of awareness can lead to negative correlations. Without external incentives or accountability, companies may underperform in their ESG efforts, reducing their financial impact.

Stakeholder engagement is a crucial driver of ESG success. Companies with active stakeholder involvement are more likely to realize the financial and non-financial benefits of their ESG initiatives.

3.5 Conceptual Framework

The conceptual framework is visually represented in Figure 1. It consists of three interrelated components: ESG disclosure quality, overall ESG performance, and firm performance. ESG disclosure quality refers to the accuracy, relevance, and transparency of the information firms provide about their sustainability practices. It serves as a communication bridge between firms and stakeholders, ensuring that ESG efforts are recognized and properly evaluated. Overall ESG performance reflects a firm's actual achievements in the environmental, social, and governance domains. This performance encompasses tangible actions such as reducing carbon emissions, promoting workplace diversity, and ensuring effective governance structures. Firm performance, measured through financial metrics such as Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS), represents the ultimate outcome of these interactions. This study hypothesizes that both ESG disclosure quality and overall ESG performance positively influence firm performance, with disclosure quality acting as a moderating factor that strengthens this relationship.

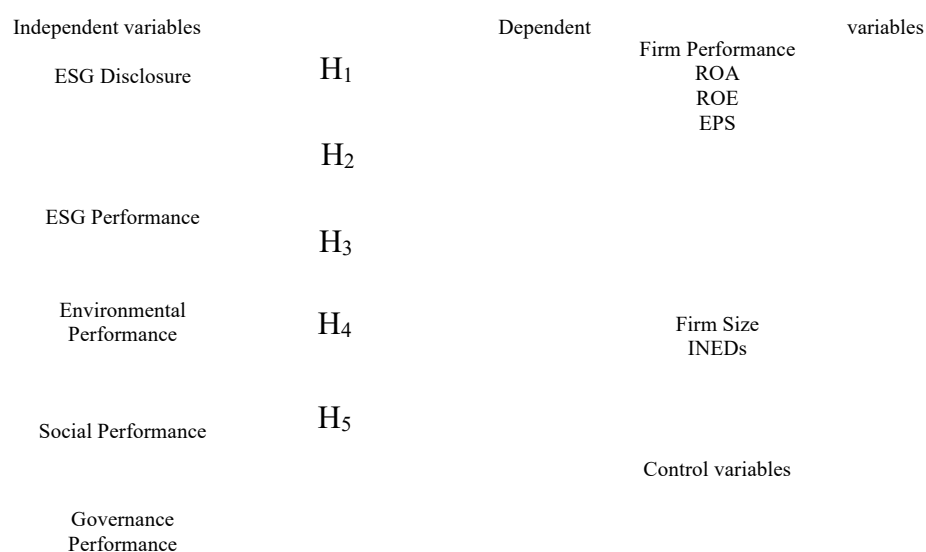


Figure 1 - Conceptual framework showing the relationship between the five independent variables and three dependent variables

3.5.1 ESG Disclosure Quality and Firm Performance

High-quality ESG disclosures are increasingly recognized as a cornerstone of effective sustainability communication. In today's data-driven economy, stakeholders demand transparent, accurate, and comprehensive ESG information to evaluate a company's sustainability efforts and their alignment with global standards. The quality of ESG disclosure depends on how reliably, relevantly, and comparably the reported information meets stakeholders' needs, making it useful for informed decision-making (Fatemi et al., 2018).

ESG disclosure quality represents a critical tool for executives to communicate sustainability commitments effectively. Signalling theory (Spence, 1973; Connelly et al., 2011) is particularly relevant here, as it posits that firms with genuine strengths in ESG areas use high-quality disclosures to convey private information that investors and stakeholders cannot easily verify otherwise. From a legitimacy theory perspective (Suchman, 1995; Deegan, 2002), high-quality ESG reporting helps firms align with societal expectations, securing their "social license to operate." In Hong Kong, with its stringent HKEX guidelines and increasing scrutiny from global investors, companies must demonstrate transparency on material issues like climate risks or labour practices to avoid reputational hits or regulatory penalties. For managers, this means viewing disclosure not as a box-ticking task but as a strategic narrative that builds credibility and mitigates legitimacy gaps, especially in sectors like public utilities or transport where stakeholder pressures are acute.

There are three possible pathways linking disclosure quality to financial performance. First, the financing channel: by lowering perceived information risk, high-quality reporting can reduce the cost of equity and debt, as evidenced in studies like Dhaliwal et al. (2011), where assured disclosures led to cheaper capital. Second, the stakeholder trust channel: transparent, comparable reports foster loyalty among customers, employees, and communities, stabilizing revenues and reducing operational disruptions. Third, the governance complementarity channel: when disclosures are underpinned by strong board oversight and internal verification processes, they minimize scepticism about greenwashing, enhancing overall market confidence (Fatemi et al., 2018). In practice, these mechanisms interplay; for instance, a Hong Kong-listed firm issuing assured ESG reports might see improved analyst ratings and investor inflows, directly supporting profitability. Based on the above arguments, the following hypothesis is proposed:

H1a: There is a positive association between ESG disclosure and firm performance, as measured by Return on Assets (ROA).

H1b: There is a positive association between ESG Disclosure and firm performance as measured by Return on Equity (ROE).

H1c: There is a positive association between ESG Disclosure and firm performance as measured by Earnings Per Share (EPS).

These hypotheses provide a framework for further empirical investigation into the specific mechanisms through which ESG disclosure influences various aspects of firm performance. It is expected that enhanced transparency through ESG disclosure could lead to improved stakeholder trust, reduced information asymmetry, and better firm

performance.

3.5.2 Overall ESG Performance and Firm Performance

While ESG disclosure quality focuses on how sustainability efforts are communicated, the actual performance of a firm across environmental, social, and governance dimensions determines its ability to create tangible value. Strong ESG performance reflects a company's operational excellence in managing sustainability risks and opportunities, which directly influences its financial outcomes.

Shifting from communication to action, overall ESG performance reflects a firm's substantive efforts across environmental, social, and governance pillars. From a stakeholder theory perspective (Freeman, 1984), firms thrive by creating value for a broad ecosystem—employees, suppliers, customers, regulators, and communities—rather than shareholders alone. Strong ESG performance, such as incorporating carbon reduction into operations or fostering inclusive workplaces, can build intangible assets like brand equity and human capital, ultimately driving long-term resilience. In Hong Kong's competitive landscape, where global investors demand ESG integration, this theory underscores why firms ignoring stakeholder needs risk erosion of market position.

Legitimacy theory reinforces this relationship by underscoring that ESG performance enhances societal approval or avoids backlash from activists or regulators (Deegan, 2002). Given the above theoretical and empirical insights, the following hypothesis is proposed:

H2a: There is a positive association between overall ESG performance and firm performance as measured by Return on Assets (ROA).

H2b: There is a positive association between overall ESG performance and firm performance as measured by Return on Equity (ROE).

H2c: There is a positive association between overall ESG performance and firm performance as measured by Earnings Per Share (EPS).

The rationale of the hypotheses is that strong ESG performance may indicate effective management of risks and opportunities, leading to improved firm performance. The growing body of evidence supporting a positive relationship between ESG performance and financial outcomes underscores the importance of stakeholder-centric approaches to corporate management. As ESG considerations continue to gain prominence in the business world, understanding the nuanced relationships between ESG factors and various measures of firm performance will be crucial for businesses, investors, and policymakers alike. Investigating the long-term effects of ESG performance on firm performance could provide insights into the sustainability of this relationship over time.

3.5.3 Environmental Performance and Firm Performance

A firm's environmental performance, such as emissions reduction and resource efficiency, is a key factor for many investors. According to the resource-based view (Porter & van der Linde, 1995), environmental excellence drives innovation by fostering cost-saving processes and developing differentiated products, thereby creating competitive edges. For example, energy-intensive sectors often leverage regulatory pressures as opportunities to improve efficiency and gain market benefits.

From a risk management and legitimacy perspective, proactive environmental strategies mitigate liabilities like fines, climate-related disruptions while signalling corporate responsibility, which helps maintain stakeholder support (Wagner et al., 2001). Managers can focus on material issues, such as water usage energy consumption in manufacturing, to align environmental efforts with financial goals effectively.

The impact of environmental performance on firm success can be understood through mechanisms such as direct cost savings (e.g., energy efficiency), revenue growth (e.g., premiums for green product premiums), and improved access to risk-adjusted financing. Derwall et al. (2005) in a longitudinal study from 1995 to 2003, found that companies with superior environmental performance tended to generate higher returns over time, indicating a lasting positive impact on market valuation. Wagner et al. (2001) provided more detailed insights, showing that enhanced environmental performance was associated with improved Return on Equity (ROE), a key indicator of shareholder value. This finding is particularly significant as it links environmental practices directly to a key metric of shareholder value. Similarly, Al Tuwaijri et al. (2004) confirmed the positive link between good environmental practices and overall firm performance. Griffin and Sun (2013) found that investors tend to view voluntary environmental disclosures positively, suggesting that transparency in environmental efforts can influence investor sentiment and stock performance.

Research in emerging market also supports this relationship. Kumar and Firoz (2018a) studying 44 Indian companies from 2011 to 2015 discovered that higher environmental disclosure scores correlated with greater Returns on Investment (ROI). This indicates that the positive relationship between environmental performance and firm

performance is consistent across different economic contexts. Based on this empirical evidence discussed above, the present study posits the following hypotheses:

H3a: There is a positive association between Environmental performance and firm performance as measured by Return on Assets (ROA).

H3b: There is a positive association between Environmental performance and firm performance as measured by Return on Equity (ROE).

H3c: There is a positive association between Environmental performance and firm performance as measured by Earnings Per Share (EPS).

Effective environmental management yields efficiencies, risk reductions, and reputational gains that bolster profitability, urging executives to integrate it into core operations. The rationale of these hypotheses is that effective environmental management may lead to cost savings, improved reputation, and better firm performance.

3.5.4 Social Performance and Firm Performance

Social performance addresses human-centric aspects such as diversity, labour rights, and community engagement. Both stakeholder and human capital theories suggest that investing in these areas can enhance productivity, improve employee retention, and foster loyalty (Servaes & Tamayo, 2013). Supporting this argument, Ghoul et al. (2011) analysed 2,009 companies from 1992 to 2007 and found that organizations with stronger corporate social responsibility (CSR) practices tend to have lower costs of capital. Their research also revealed that companies with superior social performance

often enjoy higher firm value and reduced risk profiles. In Hong Kong, where the workforce is highly diverse, companies that prioritize inclusion frequently experience lower turnover rates and greater innovation.

From the perspective of legitimacy theory, building relational capital through strong community ties helps stabilize operations. Social performance reflects a firm's commitment to addressing societal and employee concerns, including areas such as diversity, equity, inclusion, customer satisfaction, and community engagement. Strong social practices not only boost employee morale and reduce turnover but also enhance customer loyalty (Orlitzky et al., 2003). Companies that prioritize workplace diversity and fair labour practices attract top talent, leading to improved productivity and innovation.

In summary, robust social performance fosters the development of both human and relational capital. This, in turn, drives financial gains through increased efficiency, trust and stakeholder loyalty. Since empirical evidence consistently demonstrates a positive relationship between social performance and various measures of firm performance metrics, the following hypotheses are proposed:

H4a: There is a positive association between social performance and firm performance as measured by Return on Assets (ROA).

H4b: There is a positive association between social performance and firm performance as measured by Return on Equity (ROE).

H4c: There is a positive association between social performance and firm performance as measured by Earnings Per Share (EPS).

The extensive body of literature overwhelmingly supports a positive relationship between corporate social performance and firm performance. As social responsibility continues to gain prominence in the business world, understanding and leveraging this relationship will become increasingly crucial for corporate success. Research in this area will play a vital role in guiding corporate social strategies, informing policy decisions, and shaping the future of sustainable business practices. The rationale for these hypotheses is that strong social performance may enhance employee productivity, customer loyalty, and community support, potentially improving financial outcomes.

3.5.5 Governance Performance and Firm Performance

Corporate governance refers to the system of rules, practices, and processes by which a company is directed and controlled. As Esteban-Sanchez et al. (2017) note, it represents an organization's code of conduct ensuring that board members and executives act in the interests of stakeholders. This definition underscores the critical role of governance in aligning corporate actions with stakeholder expectations.

Governance performance is an important driver because it underpins all ESG efforts, ensuring alignment and accountability. Agency theory (Jensen & Meckling, 1976) asserts that strong mechanisms like independent boards and ethical controls minimize conflicts, thereby improving decisions and resource use.

A significant body of literature has consistently reported a positive relationship between superior corporate governance practices and financial performance (Esteban-Sanchez et al., 2017; Jamali et al., 2008; Velte, 2017). Soana (2011) provided early evidence of

this relationship, demonstrating a significant positive impact of corporate governance performance on financial performance. Ntim et al. (2013) extended this research by exploring the mechanisms through which governance impacts performance. Their study revealed that firms with strong corporate governance practices could effectively reduce stakeholder-manager conflicts, thereby enhancing overall organizational efficiency and performance.

Mirasro Rodríguez et al. (2015) approached the topic from an agency theory perspective. Their research indicated that firms with poor governance practices face high agency conflicts and, consequently, lower profitability. This finding highlights the role of effective governance in mitigating agency costs and aligning management actions with shareholder interests.

From the risk management perspective, Sassen et al. (2016) conducted an extensive study examining the relationship between ESG factors and various types of organizational risk across 8,752 listed companies in Europe from 2002 to 2014. While their findings showed that improved environmental performance significantly reduced organizational risk, the impact of governance enforcement on risk was less clear-cut. This nuanced result suggests that the relationship between governance and risk may be more complex than previously thought.

Rose (2016) provided insights into the governance-performance relationship within a specific national context, finding a positive correlation between corporate performance and financial performance in Danish companies. This study underscores the importance of considering national legal and cultural frameworks when evaluating governance

practices.

Turning to return on equity, Duen et al. (2016) offered a more detailed analysis, specifically examining the impact of corporate governance on Return on Equity (ROE). Their finding of a positive relationship between governance performance and ROE provides valuable insights for shareholders and investors. A more recent research by Esteban-Sanchez et al. (2017) has reaffirmed the significant positive relationship between corporate governance performance and financial performance. They also noted that new legislation has strengthened the reputation of corporate boards, highlighting the evolving nature of governance practices in response to regulatory changes.

Erhardt et al., (2003) conducted a study to examine the effectiveness of firms' internal control mechanisms, including board independence, shareholder rights, and ethical leadership. They found that effective governance reduced agency conflicts, enhanced decision-making, and ensured alignment between managerial actions and shareholder interests. For instance, firms with independent and diverse boards were better equipped to oversee ESG strategies, ensuring their alignment with corporate goals. Given the empirical support mentioned above, the present study posits the following hypotheses:

H5a: There is a positive association between governance performance and firm performance as measured by Return on Assets (ROA).

H5b: There is a positive association between governance performance and firm performance as measured by Return on Equity (ROE).

H5c: There is a positive association between governance performance and firm performance as measured by Earnings Per Share (EPS).

3.5.6 Control Variables

Given the diverse and heterogeneous nature of listed companies in Hong Kong, two control variables are included in the model: board independence, measured as the proportion of Independent Non-Executive Directors (INEDs) and firm size. These variables are incorporated to minimise their influence on the results. This approach ensures that the unique impact of ESG factors on ROA, ROE, and EPS is accurately isolated. At the same time, it acknowledges that certain fundamental characteristics of firm may inherently affect their performance.

3.5.6.1 Board Independence

Board governance is of particular importance, particularly in Hong Kong where HKEX requires at least one-third INEDs for listed firms. Agency theory (Fama & Jensen, 1983) underscores how independent directors curb managerial self-interest, enhance monitoring, and optimize capital allocation. These are crucial for ESG initiatives that require long-term commitment. Stakeholder theory (Freeman, 1984) extends this, positioning INEDs as balancers of diverse interests, fostering transparency and ethical oversight that align with broader societal expectations (Ahmed et al., 2006; Cheng & Courtenay, 2006). From an audit perspective, independence bolsters risk management and compliance, reducing opportunism (Shaukat et al., 2016; Ortas et al., 2017).

Previous studies show mixed effects on performance. Some studies found enhanced board effectiveness without profitability gains (Cucari et al., 2018; Birindelli et al., 2018), likely due to contextual factors like industry or culture. However, independence often enables better ESG execution by providing objective scrutiny, mitigating conflicts,

and supporting stakeholder-oriented decisions (Zahra & Stanton, 1988; Haniffa & Cooke, 2005). In Hong Kong, where family firms dominate in some sectors, INEDs can counter entrenchment, amplifying ESG's impact.

In general, independent directors' compensation is typically not tied to short-term firm performance. This structure allows them to focus on long-term value creation and the fulfilment of broader social responsibilities (Ibrahim et al., 2003; Ahmed et al., 2006; Cheng and Courtenay, 2006; Jizi et al., 2014). Zahra and Stanton (1988) and Haniffa and Cooke (2005) suggest that independent directors are more likely to respect the needs of diverse stakeholders as they develop their identity and status within the company. This broader perspective can lead to more balanced and sustainable corporate strategies.

It appears that board independence emerges as a critical factor in shaping effective corporate governance and, by extension, overall firm performance. While theoretical arguments strongly support the value of independent directors, the complex nature of corporate governance necessitates a nuanced approach to examine the relationship. As corporate governance practices continue to evolve, understanding the multifaceted role of board independence will be crucial for researchers, practitioners, and policymakers alike.

3.5.6.2 Firm Size

Firm size, typically measured by market capitalization, is a critical control variable in examining the relationship between ESG performance and firm performance. Market capitalization reflects the total market value of a company's outstanding shares and

serves as a proxy for firm resources, market power, and operational scale. Larger firms often have greater financial resources and institutional support to invest in ESG initiatives, which could enhance their performance compared to smaller firms (Waddock & Graves, 1997). Additionally, larger firms are more visible to stakeholders, leading to increased scrutiny of their ESG practices, which can influence their reputation and financial outcomes (Orlitzky et al., 2003).

The resource-based view posits that larger firms leverage abundant resources for ESG investments, absorbing costs and innovating sustainably (Udayasankar, 2008). Economies of scale enable efficient ESG systems, like data analytics for reporting or supply-chain audits. Legitimacy theory adds that firm size heightens visibility and stakeholder scrutiny, compelling robust practices to maintain social license (Albu et al., 2014).

Including firm size as a control variable helps isolate the specific impact of ESG performance on firm performance by accounting for variations attributable to the scale of operations. Without this control, the observed relationship may be confounded by size-related factors, such as economies of scale or access to capital, that independently affect firm performance (Godfrey et al., 2009). Thus, firm size is an essential factor to ensure robust and unbiased estimation of the ESG-firm performance relationship, especially in the context of Hong Kong, where listed companies vary significantly in size and market influence.

3.6 Chapter Summary

This chapter presents a comprehensive theoretical framework underpinning the relationship between Environmental, Social, and Governance (ESG) factors and firm performance. It develops five key hypotheses and introduces two control variables to elucidate this complex relationship.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter describes how the study examines whether ESG disclosure and ESG performance are associated with accounting-based firm performance among Hong Kong-listed companies. The focus is on four sectors where ESG risks and opportunities are especially salient. These sectors include property development, public transport, public utilities, and catering. The analysis covers the pre-pandemic period from 2017 to 2019. Hong Kong provides a relevant setting because it is a leading Asian financial centre. In addition, the evolution of the HKEX ESG Code, and growing alignment with global standards (e.g., TCFD and ISSB) have collectively raised expectations for ESG practices and reporting quality. The selected sectors encompass distinct material issues. For example, transport and utilities are characterised by concerns related to carbon emissions and energy intensity. catering faces challenges related to human capital and supply chain issues. Property development is associated with governance and environmental impacts. Focusing on these sectors enables the study to observe meaningful variation in ESG inputs and outcomes within a coherent regulatory and market context.

The chapter begins by describing the research design and rationale for choosing quantitative methods. It then details the data collection process, including the selection of variables and sources of data. The statistical techniques used to analyse the data, including models for investigating the hypotheses, are also discussed. Finally, the

limitations, assumptions, and robustness checks are outlined to provide transparency and ensure the reliability of the research findings.

4.2 Research Design

The study employed a quantitative, deductive research design to explore the relationship between ESG factors and firm performance. This approach was chosen to facilitate the measurement and analysis of numerical data, enabling the establishment of quantifiable relationships between variables. Five hypotheses, grounded in existing theoretical frameworks, guided the study in alignment with the deductive nature of quantitative research (Bryman & Bell, 2015). Specifically, the hypotheses were informed by stakeholder theory (Freeman, 1984), agency theory (Jensen & Meckling, 1976), and legitimacy theory (Suchman, 1995). These theories collectively suggest that ESG practices and disclosures can enhance firm performance by fostering stakeholder support, reducing agency costs, and improving organizational legitimacy.

To analyse the data, panel methods were employed, offering the advantage of capturing both cross-sectional differences between firms and longitudinal changes within firms. This approach also controls for unobserved firm-specific traits that remain constant over time, such as organizational culture, legacy strategies, or brand equity, which could otherwise introduce bias into corporate studies. By accounting for these factors, the study ensured that the observed relationships between ESG factors and firm performance were more robust and reliable.

The unit of analysis is the firm-year. A balanced panel of Hong Kong-listed issuers drawn from four sectors were assembled where ESG risks and opportunities are comparatively pronounced: property development, public transport, public utilities, and catering. The observation window spans financial years 2017 to 2019. This window was selected to balance three needs: stable ESG coverage, comparability across firms, and insulation from pandemic-era reporting disruptions.

4.3 Variables Used in the Study

All the variables used in this study are summarized in Table 4. The dependent variables measure firm performance and include Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS). The independent variables reflect different aspects of ESG practices. These include the level of ESG disclosure (ESGD), overall ESG performance (ESGP), and individual scores for environmental (EP), social (SP), and governance (GP) performance. The definitions of these variables and the reasons for their selection are explained in the following sections.

Table 4 Definition of Dependent and Independent Variables Used

Variables	Types	Definition	Formula/Range
ROA	Dependent	Return on Assets	Net income / Total assets
ROE	Dependent	Return on Equity	Net income / Average shareholders' equity
EPS	Dependent	Earnings per share	Net income / Number of shares outstanding
ESGD	Independent	Firm ESG disclosure level	0 to 100
ESGP	Independent	Firm ESG performance level	0 to 10
EP	Independent	Firm Environmental performance level	0 to 10
SP	Independent	Firm Social performance level	0 to 10
GP	Independent	Firm Governance performance level	0 to 10

4.3.1 Dependent Variables

Return on Assets (ROA) captures how efficiently assets generate earnings, relevant for sectors with significant capital bases (property, utilities). It is crucial for managers and investors to evaluate how effectively a company converts its resources into profit and can be viewed as a return on investment measure (Selling and Stickney, 1989). It reflects the effectiveness of a corporation in earning returns on its invested assets and allows for comparison across companies of different sizes. The measure is considered the widely used in ESG-financial performance studies (Alareeni & Hamdan, 2020).

Return on Equity (ROE) reflects profitability relative to shareholder capital. Average market ROE is typically around 10% (Fama, E.F. and French, K.R. (2000)) and is widely used in studies examining the relationship between financial performance and corporate social performance (Besso et al., 2013; Deng et al., 2013; Ioannou & Serafeim, 2014; Luo et al., 2013). ROA reflected a company's efficiency in generating profits

from shareholders' investments. Griffin and Mahon (1997) also pointed out that ROE is the single most important indicator for investors to measure firm's performance.

Earnings per Share (EPS) represents a company's profitability on a per-share basis and serves as a straightforward indicator of its market value. Generally, a higher EPS suggests a higher overall valuation. Investors widely favour EPS because it allows easy comparison across different industries and provides a market-based perspective on how the market perceives a company's earnings potential.

This study uses basic earnings per share (EPS) as a measure of performance instead of diluted EPS. Although diluted EPS offers a more conservative and realistic view of a company's per-share profitability, its calculation relies on model assumptions that can differ across firms and over time (IASB, 2023). From a construct validity standpoint, our research focuses on the relationship between ESG and profitability attributable to existing common shareholders. Basic EPS is better suited to this objective because it reflects the realized earnings per current common shareholders, whereas diluted EPS blends operating results with capital structure contingencies and market-driven factors. Both EPS and Tobin's Q are commonly used as proxies for measuring a firm's performance in ESG studies ((Orlitzky, Schmidt and Rynes, 2003; Friede, Busch and Bassen, 2015). In this study, the researcher chose to use EPS instead of Tobin's Q to assess the impact of ESG performance on companies listed in Hong Kong. This decision is based on several key considerations. While Tobin's Q reflects market expectations of future profitability by comparing market value to asset replacement costs, it has certain limitations in this context. First, Tobin's Q is susceptible to market volatility and speculative trading, which can distort its reflection of a company's long-

term performance, especially regarding the influence of ESG initiatives. Conversely, EPS offers a more direct and stable measure of a company's profitability, capturing actual earnings from operations. This is particularly relevant when assessing the long-term effects of ESG strategies, which may not immediately translate into significant market valuation changes. Secondly, calculating Tobin's Q requires precise market capitalization data, which can be unreliable or less available for smaller or less-liquid companies in Hong Kong. EPS, derived from publicly available accounting data, tends to be more consistent and accessible across a broader range of firms, enabling a more comprehensive analysis with a larger sample. Thirdly, since the focus is on understanding how ESG initiatives influence firm performance, a measure that directly captures financial outcomes is essential. EPS, as an indicator of profitability per share, clearly links operational decision such as ESG efforts to financial results. In contrast, Tobin's Q incorporates market expectations but is less directly connected to the operational efficiency and profitability, which are often the primary effects of effective ESG strategies.

In summary, although Tobin's Q has its advantages, EPS offers a more robust and reliable measure of firm performance within this specific research context. It offers a stable, readily available, and directly interpretable indicator of financial health, making it better suited for analysing the impact of ESG initiatives on company performance.

4.3.2 Independent Variables

ESG Disclosure Score (ESGD): ESGD is a proprietary numeric score provided by Bloomberg, ranging from 0 to 100. It quantifies the extent and quality of a company's disclosure regarding Environmental, Social, and Governance (ESG) practices. A higher ESGD score indicates more comprehensive and transparent ESG reporting, which is critical for stakeholders seeking to assess a firm's sustainability communication.

Overall ESG Performance Score (ESGP): ESGP is another proprietary metric from Bloomberg, ranging from 0 to 10. Unlike the disclosure score, ESGP evaluates the actual performance of a company across environmental, social, and governance dimensions. This score reflects the company's substantive actions and outcomes, rather than just its reporting practices.

Environmental Performance Score (EP): The EP score, also provided by Bloomberg, measures a company's environmental performance on a scale from 0 to 10. It considers various aspects such as resource efficiency, emissions reduction, and environmental management initiatives. This score provides a focused assessment of the environmental pillar within the ESG framework.

Social Performance Score (SP): SP is a Bloomberg-derived score ranging from 0 to 10, assessing a company's social performance. It examines factors like employee welfare, diversity, community engagement, and customer relations. The SP score helps gauge how well a company manages its social responsibilities.

Governance Performance Score (GP): GP is a governance-focused performance score, also ranging from 0 to 10, sourced from Bloomberg. It reflects the quality of a company's governance structures and practices, including board composition, ethical conduct, and executive accountability. Strong governance is often seen as a foundation

for effective ESG integration.

In summary, the variables chosen for this study represent both traditional accounting-based measures of firm performance and ESG metrics widely used by practitioners and researchers. The performance variables (ROA, ROE, EPS) capture different dimensions of profitability and shareholder value, while the ESG variables (ESGD, ESGP, EP, SP, GP) provide a nuanced view of a company's sustainability strategy, disclosure quality, and actual outcomes across environmental, social, and governance domains. All variables are sourced from Bloomberg, ensuring reliability and comparability across firms and time periods. This comprehensive operationalization enables an in-depth investigation of how ESG factors influence financial performance in the context of Hong Kong-listed companies.

4.4 Data Sampling and Sample Construction

There is no single collectively universally accepted ESG measurement in the academic world. Various research institutes measure ESG performance using different approaches and methodology including Thompson Reuters, Bloomberg ESG metrics and Morgan Stanley Environmental, Social and Governance (MSCI ESG) Index. This study used Bloomberg ESG metrics because they provide comprehensive data and have been widely utilized in previous academic research (Dhaliwal et al. 2011 and Krüger 2015).

All ESG and financial data are sourced from the Bloomberg Terminal. Bloomberg aggregates information from annual and sustainability reports, regulatory filings, press releases, and third-party research, and maintains standardized ESG disclosure and performance metrics across firms and time. Financial statement variables are taken

from the same platform to ensure consistent definitions.

The sampling frame consists of Hong Kong-listed companies with: (1) Bloomberg ESG coverage; (2) market capitalization of at least HK\$5 billion; and (3) classification into one of the four focal sectors. An initial panel covering 2017–2021 was assembled. Exploratory screening revealed pervasive gaps and timing inconsistencies in pillar-level ESG data for 2020–2021, plausibly linked to pandemic disruptions in reporting cycles and operational suspensions. To protect data integrity and preserve a balanced panel, the final dataset was restricted to firms with complete data for 2017–2019 across all variables of interest. The resulting sample includes 180 firms: 48 in property development, 42 in public transport, 40 in public utilities, and 50 in catering (see Table 5). This composition provides both breadth across industries and depth within each sector, enabling comparison and inference while maintaining statistical power.

Table 5 Data Selection

Description	Sample	Observation
Companies listed in Hong Kong Stock Exchange	2,200	1,279
Companies with ESG score information from 4 sectors	1,000	180

The Bloomberg ESG disclosure scores consist of three major dimensions: environmental, social and governance. The environmental disclosure score consists of (a) total greenhouse gas, (b) emissions, (c) total energy, (d) consumption, (e) water consumption, (f) hazardous waste, (g) total waste, and (h) environmental fines. The social disclosure scores include (a) the total number of employees, (b) the percentage of women in the workforce (c) the percentage of women in management (d) the percentage of women in the workforce, and percentage of minorities in management.

The government disclosure scores reflect: (a) the size of the Board (b) independent directors: (c) percentage of independent directors (d) board duration (e) the number of board meeting (f) board meeting attendance, and (g) political campaign contributions and donations.

The independent variables, ESG, EP, SP and GP were measured using the ESG rating published in the Bloomberg's database. The ESG sub-criteria for all data sets were labelled as E (Environmental), S (Social) and G (Governance) whereas the overall ESG score includes all three factors (see Table 6). All the performance scores were between the range of 0 (for companies that disclosure minimal performance) to 10 (for companies all data of performance).

Table 6 Operationalization of Variables

Name	Variable	Type	Operationalization	Source
Return on Assets	ROA	Ratio	Indicator of how profitable a company is relative to its total assets, in percentage calculated as (Net Income / Average Total Assets) * 100	Bloomberg
Return on Equity	ROE	Ratio	Measure of a corporation's profitability calculated as: (Net Income Available for Common Shareholders / Average Total Common Equity) * 100	Bloomberg
Earnings per share	EPS	Ratio	Net income of a firm over the number of the issued share capital of the company (Net Income/Number of Ordinary shares outstanding)	Bloomberg
ESGD-Score	ESGD	Numeric	Proprietary Bloomberg Disclosure score ranging from 0 to 100 based on the extent of a company's Environmental, Social, and Governance (ESG) Disclosure	Bloomberg
ESG-Score	ESGP	Numeric	Proprietary Bloomberg performance score ranging from 0 to 10 based on the extent of a company's Environmental, Social, and Governance (ESG) performance	Bloomberg
E-Score	EP	Numeric	Proprietary Bloomberg performance score ranging from 0 to 10 based on the extent of a company's environmental performance as part of Environmental, Social, and Governance (ESG) data	Bloomberg
S-Score	SP	Numeric	Proprietary Bloomberg performance score ranging from 0 to 10 based on the extent of a company's social performance as part of Environmental, Social, and Governance (ESG) data	Bloomberg
G-Score	GP	Numeric	Proprietary Bloomberg performance score ranging from 0 to 10 based on the extent of a company's governance performance as part of Environmental, Social, and Governance (ESG) data	Bloomberg

4.5 Data Analysis Strategy and Model Selection

The study employed a combination of multiple regression and panel data analysis to investigate the relationship between ESG factors and firm performance. This approach allowed for a robust examination of both cross-sectional and time-series effects in the dataset. The panel data regression analyses were employed to test whether ESG performance and its sub-components (EP, SP, GP and ESGP) had relations with firm performance (ROA, ROE and EPS) and whether the control variables such as proportion of independent board and firm size had any impact on the firm performance. The researcher tested the assumptions of regression using on linearity, homoscedasticity of residue, normal distribution of error term and multicollinearity.

According to Gujarati and Porter (2009), data are time series if the variables are in a set of times, while data are cross-section if there are many subjects but are at the same point in time. Panel data regression is often used in analysing datasets containing different participants and time spans showing how the data evolve over time. Although pooled ordinary least squares can be used on panel data, it might not provide optimum results. A constant or a random variable can be used in the variation in time and cross-sections to develop panel data regression models like fixed effects model and the random effect model.

Random effect model assumes that the variation between entities is random and unrelated to the model's independent variables showing its ability to include variables that remain constant across time. On the other hand, the fixed model assumes that the predictor has common slopes and variance but with company-specific intercepts. In order to determine whether to use fixed effect model or a random effect mode, Hausman

test was used. The null hypothesis of Hausman's test assumes that the ordinary least-squares (OLS) estimation is consistent meaning that the random effect model should be used. The alternative hypothesis assumes that OLS estimation is inconsistent meaning fixed effect model is more suitable.

According to Cohen et al. (2013), five key assumptions are applicable to multiple regression analysis namely multicollinearity, normality, linearity, homoscedasticity and independence of residuals. Multicollinearity test, heteroscedasticity test and normality test are conducted to reduce the potential biases which may appear in regression model to confirm the validity of the data that will be used in regression study.

The researcher used a 95% confidence interval for our analyses with p-value < 0.05 indicates statistical significance. The coefficients with $p < 0.05$ are interpreted as evidence of a significant relationship (positive or negative) between the independent and dependent variables.

The estimation strategy separates time-invariant firm characteristics from within-firm variation and selects models based on tests rather than convenience. For each financial performance (FP) variable (ROA, ROE, EPS), the researcher estimates two specifications:

- ESG Disclosure and overall ESG performance:

$$FP_{it} = \alpha + \beta_1 ESGD_{it} + \beta_2 ESGP_{it} + \beta_3 Size_{it} + \beta_4 IOB_{it} + e_{it}$$

- Independent ESG performance:

$$FP_{it} = \alpha + \beta_1 EP_{it} + \beta_2 SP_{it} + \beta_3 GP_{it} + \beta_4 Size_{it} + \beta_5 IOB_{it} + e_{it}$$

Table 7 The symbols used in the Panel Regression Analysis

Symbol	Description
α	Intercept
β	Regression Coefficient
i	Company i
t	Period t
ESGD	Environmental, Social, and Governance Disclosure
EP	Environmental Performance
SP	Social Performance
GP	Governance Performance
ESGP	Environmental, Social, and Governance Performance
ROA	Return on Assets
ROE	Return on Equity
EPS	Earnings Per Share
Size	Firm Size
IOB	Independent Board
ϵ	Error

The process of model selection was conducted systematically, commencing with the estimation of a pooled ordinary least squares (OLS) regression to establish baseline parameters and to assess the behaviour of residuals. Next, the researcher applied the Breusch–Pagan Lagrange Multiplier test to determine whether random effects were preferred over pooled OLS. (i.e., whether panel effects exist). If panel effects were identified, Hausman tests were conducted to decide between fixed and random effects model. Fixed effects were used if the null hypothesis of random effects consistency was rejected; otherwise, random effects results were retained.

Six panel data regression models were estimated to examine various relationships between ESG factors and firm performance (see Table 8). The first model (Model 1) investigated the relationship between ESG performance (ESGP), ESG disclosure (ESGD), and firm performance as measured by Return on Assets (ROA), to test hypotheses H1a and H2a. The second model (Model 2) examined the association between ESGP, ESGD, and firm performance reflected in Return on Equity (ROE), to

evaluate hypotheses H1b and H2b. The third model (Model 3) analysed the relationship between ESGP, ESGD, and Earnings per Share (EPS), aiming to test hypotheses H1c and H2c. The fourth model (Model 4) explored how the three ESG pillars—Environmental Performance (EP), Social Performance (SP), and Governance Performance (GP)—relate to firm performance (ROA), to assess hypotheses H3a, H4a, and H5a. To test hypotheses H3b, H4b, and H5b, the fifth model (Model 5) analysed the relationship between these three ESG pillars and firm performance measured by ROE. Finally, the sixth model (Model 6) examined the relationship between EP, SP, GP, and EPS, with the goal of testing hypotheses H3c, H4c, and H5c.

Table 8 Components of the 6 Models

Model	Dependent Variable	Independent Variable	Hypotheses
Model 1	ROA	ESGP ESGD	H1a, H2a
Model 2	ROE	ESGP ESGD	H1b, H2b
Model 3	EPS	ESGP ESGD	H1c, H2c
Model 4	ROA	EP SP GP	H3a, H4a, H5a
Model 5	ROE	EP SP GP	H3b, H4b, H5b
Model 6	EPS	EP SP GP	H3c, H4c, H5c

4.6 ESG Performance Across 4 Industries

Firms' overall and individual ESG performance across four industries was analysed using ANOVA tests. Following this, the Games-Howell post-hoc tests were conducted, as it is particularly appropriate when the assumption of equal variances (homogeneity of variance) is violated and when group sizes are unequal. These comparisons do not

establish causality; instead, they provide descriptive insights into the areas where ESG strengths and weaknesses are concentrated across industries in Hong Kong.

4.7 Software and implementation

The empirical work combines two tools. Jamovi was used for descriptive statistics, visualization, and outlier inspection. EViews was used for panel regressions, including pooled OLS baselines, LM tests, and Hausman tests, as well as the computation of firm-clustered robust standard errors. To support reproducibility, data transformations, inclusion and exclusion decisions, and model selections are logged, and intermediate outputs are archived.

4.8 Validity and reliability

Validity and reliability are essential features of any research. Validity includes constructive validity, internal validity and external validity. Construct validity was supported by using Bloomberg's established ESG framework, which separates disclosure from performance and provides consistent, numeric scores. Financial metrics were sourced from published audited statements. The inclusion of Size and IOB addressed plausible confounds.

Internal validity was enhanced through panel methods that account for time-invariant firm characteristics and through robust standard errors to mitigate heteroskedasticity and within-firm correlation. Since reverse causality cannot be fully ruled out in a short panel, the present study avoids making causal claims and focuses on the associations

between ESG factors and firm performance.

External validity is limited by the study's design, as the results apply specifically to Hong Kong-listed firms in the four focal sectors during 2017–2019. While these sectors provide a meaningful context for examining ESG practices, caution should be exercised when generalising the findings to other industries or time periods.

Reliability was supported by standardised data collection (Bloomberg), explicit screening rules, and a clear, repeatable model selection protocol. Random cross-checks against company filings further reduced data entry errors.

4.9 Assumptions

Several assumptions are explicit. First, Bloomberg's ESG and financial data are assumed to be accurate and sufficiently reflective of firms' practices, recognizing that ESG data often originate from company disclosures and may embed reporting biases. Second, firms with available ESG data are assumed not to differ systematically from those without in ways that would bias associations; the minimum market capitalization threshold and sector selection help stabilize coverage quality. Third, ROA, ROE, and EPS are assumed to be appropriate indicators of accounting performance over the short horizon studied. These assumptions are common in ESG-finance research and are mitigated by transparent methods, robustness checks, and a focus on associations rather.

4.10 Limitations

The study has four main limitations. First, the three-year horizon may understate lagged benefits of ESG initiatives, which can take longer to materialize in financial outcomes. Second, reliance on a single ESG provider introduces provider-specific measurement choices; triangulation was constrained by coverage gaps in alternative datasets for the focal period. Third, pandemic years (2020–2021) were excluded to protect data integrity, but this also shortens the panel and precludes analysis of ESG resilience during crisis. Fourth, the observational design limits causal inference despite efforts to control for confounds; results are interpreted as associations.

These limitations are explicit and help define a future research agenda: longer panels that span regulatory phases, multi-provider ESG triangulation, and identification strategies exploiting shocks or quasi-experiments.

4.11 Delimitation

The study was limited to companies with available ESG data, which may introduce selection bias. The focus on four sectors might limit the generalizability of findings to other industries. The study covered a three-year period (2017-2019), which might not capture long-term trends or effects of ESG practices. The research also limited to Hong Kong-listed companies, which might limit the applicability of findings to other markets or regions. While ROA, ROE, and EPS are widely used, they may not capture all aspects of firm performance. Other metrics, such as Tobin's Q, could provide additional insights but are not included in the primary analysis. The study could establish

correlations but might not definitively prove causality between ESG factors and firm performance. Macroeconomic conditions, regulatory changes, or other external factors that might influence both ESG practices and firm performance was not explicitly controlled for in the study.

4.12 Chapter summary

This chapter explains the methodology used to examine the relationship between ESG disclosure, ESG performance, and firm performance, measured through accounting metrics, among Hong Kong-listed companies in four sectors with high ESG relevance. A clear distinction is made between ESG disclosure and ESG performance measures to ensure precise analysis. The study employs panel data regression to analyse the data, prioritising clarity and reproducibility in its findings. The following chapter will present the empirical results, evaluate the hypotheses, and discuss the implications for issuers, investors, and policymakers as they navigate Hong Kong's evolving ESG landscape.

CHAPTER FIVE

ANALYSIS AND RESULTS

5.1 Introduction

This chapter presents the results of the data analysis in a structured manner. It begins by outlining the procedures used for data screening. Next, it reports the descriptive statistics and examines the correlations among the variables used in the study. Following this, the chapter evaluates whether the assumptions of the regression models are met. It then compares ESG disclosure and performance across the four industries. Finally, the chapter concludes with hypothesis testing using panel data regression.

5.2 Missing Data and Outliners

The dataset was screened for missing values and outliners. Although the original study period was from 2017 to 2021, further investigation revealed that many companies did not report their ESG activities during 2020 to 2021, likely due to the COVID-19 pandemic. The researcher also attempted to incorporate MSCI data but found it was missing as well. As a result, the entire 2-year period (2020 and 2021) was excluded to ensure data reliability. Two outliers were identified with abnormally high values. Specifically, a property developer's ROA was over 50% and a catering operator's ROE was 300%. They were both removed to minimize their impact on the regression results. This was cross-checked against companies' annual reports and bulletins to ensure the accuracy and integrity of the data, further validating the identification of outliers.

5.3 Descriptive Statistics

Table 9 presents the descriptive statistics for all variables in our study, based on a sample of 178 companies with 534 firm-year observations from 2017 to 2019, after eliminating outliers. The table includes mean, median, maximum, minimum values, standard deviation and skewness for ESG factors (ESGD, ESGP, EP, SP and GP) and firm performance indicators (ROA, ROE and EPS), along with control variables (IOB and Size).

ESG disclosure (ESGD) had a mean score of 48.11 on a scale from 0 to 100. The median score was 48.1, suggesting that half of the companies in the sample scored below 50. Regarding specific ESG components, the average Environmental Performance (EP) score was 3.33, with a standard deviation of 1.54. Social Performance (SP) and Governance Performance (GP) had mean scores of 3.64 and 3.75, with standard deviations of 1.21 and 1.16, respectively. Among the three ESG components, GP achieved the highest average score, indicating ongoing improvements in governance driven by current regulatory pressures (Lin and Goo, 2019). In contrast, EP scored the lowest, highlighting the need for further progress in environmental initiatives.

Table 9 Descriptive Statistics

	SECTOR	ESGD	ESGP	EP	SP	GP	ROA	ROE	EPS	SIZE	IOB_R
Mean	2.511236	48.11124	2.913427	3.327903	3.640019	3.754457	4.837509	12.54848	1.269944	2.453184	3.882022
Median	2.500000	48.10000	2.790000	3.250000	3.630000	3.680000	3.820000	10.81500	0.520000	2.000000	4.000000
Maximum	4.000000	80.52000	8.690000	8.730000	8.610000	9.370000	31.70000	115.2200	17.34000	10.00000	8.000000
Minimum	1.000000	10.33000	0.230000	0.340000	0.350000	0.720000	-13.87000	-61.86000	-1.240000	1.000000	1.000000
Std. Dev.	1.153698	8.943586	1.412889	1.537556	1.206677	1.162521	4.881176	12.77523	2.170799	1.769202	1.708366
Skewness	-0.005398	-0.384521	0.763759	0.491212	0.238279	0.934818	1.394889	2.180109	4.048933	2.044908	0.828042
Kurtosis	1.562904	5.374778	3.906413	3.491666	4.000629	6.007888	7.782845	22.59717	24.36572	7.807172	2.872917
Jarque-Bera	45.95428	138.6397	70.19649	26.85336	27.33114	279.0801	682.1508	8968.097	11616.04	886.3399	61.38256
	0.000000	0.000000	0.000000	0.000001	0.000001	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	1341.000	25691.40	1555.770	1777.100	1943.770	2004.880	2583.230	6700.890	678.1500	1310.000	2073.000
Sum Sq. Dev.	709.4326	42633.46	1064.005	1260.054	776.0849	720.3256	12699.20	86989.00	2511.693	1668.330	1555.567
Observations	534	534	534	534	534	534	534	534	534	534	534

5.4 Correlation Analysis

Table 10 presents the Pearson's pairwise correlation coefficients among all variables used in the study. These coefficients reveal the strength and direction of the linear relationships between pairs of variables. A coefficient near 0 indicates a weak or no association. A value close to +1 signifies a strong positive relationship, while a coefficient near -1 indicates a strong negative relationship.

Table 10 Correlation Statistics

Sample: 1 534

s: 534

Covariance Correlation t-Statistic	ESGD	ESGP	EP	SP	GP	ROA	ROE	EPS	SIZE	IOB R
ESGD	79.83793 1.000000 -----									
ESGP	3.418810 0.271062 6.495259	1.992518 1.000000 -----								
EP	3.683026 0.268334 6.424788	0.583666 0.269178 6.446558	2.359651 1.000000 -----							
SP	2.922334 0.271295 6.501265	0.289980 0.170406 3.988764	0.205843 0.111155 2.579783	1.453343 1.000000 -----						
GP	1.331429 0.128298 2.983866	0.362584 0.221164 5.230693	0.117183 0.065682 1.518248	0.175130 0.125079 2.907792	1.348924 1.000000 -----					
ROA	-0.281767 -0.006466 -0.149153	0.070663 0.010265 0.236783	-0.412347 -0.055045 -1.271559	0.034241 0.005824 0.134342	-0.206242 -0.036414 -0.840446	23.78126 1.000000 -----				
ROE	-0.632401 -0.005545 -0.127905	0.504317 0.027992 0.645902	-0.658813 -0.033603 -0.775492	1.230978 0.080003 1.851207	0.371247 0.025044 0.577830	40.96686 0.658194 20.16516	162.9008 1.000000 -----			
EPS	2.679944 0.138296 3.220754	-0.221728 -0.072428 -1.674957	-0.127034 -0.038132 -0.880148	0.032435 0.012406 0.286157	-0.212836 -0.084496 -1.955914	1.270705 0.120148 2.791438	2.110811 0.076256 1.763995	4.703544 1.000000 -----		
SIZE	3.362623 0.212914 5.026121	0.267286 0.107128 2.485232	0.182861 0.067348 1.556929	0.200048 0.093881 2.174991	0.067868 0.033060 0.762945	2.072646 0.240457 5.713813	1.678833 0.074418 1.721224	1.231748 0.321321 7.826336	3.124213 1.000000 -----	
IOB R	1.513067 0.099216 2.299766	-0.053229 -0.022094 -0.509721	-0.182026 -0.069428 -1.605247	0.027755 0.013489 0.311157	0.176612 0.089095 2.063189	0.274182 0.032942 0.760219	-1.802763 -0.082757 -1.915365	0.183739 0.049638 1.146320	0.090919 0.030138 0.695444	2.913048 1.000000 -----

Contrary to previous research, ESG components—Environmental Performance (EP), Social Performance (SP), and Governance Performance (GP)—were not positively associated with firm performance metrics such as Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS). The correlation coefficients ranged from -0.03 to +0.08, and none exceeded 0.8, indicating that the relationships were weak or near zero and multicollinearity was not a significant concern in the data (Hair, et al., 2009).

Interestingly, EP was negatively related to all three performance indicators—ROA, ROE, and EPS. GP also showed negative correlations with ROA and EPS, while SP had a mild positive impact on all three metrics. When examining the relationships between overall ESG performance (ESGP), ESG disclosure (ESGD), and financial

performance, the data revealed that ESGP was positively correlated with ROA and ROE but negatively correlated with EPS. ESGD, on the other hand, showed a negative relationship with ROE but a positive relationship with ROA and EPS.

The effects of control variables on financial performance varied. For example, the proportion of Independent Non-Executive Directors (IOB) was negatively related to ESGP, EP, and ROE. Conversely, firm size was positively associated with all performance indicators, although the effect was minimal.

Overall, the lack of strong positive correlations between ESG factors and financial performance suggests that, in Hong Kong-listed companies, the relationship between ESG practices and financial outcomes may be more complex than previously thought. This highlights the importance of the subsequent regression analyses, which will provide a more comprehensive understanding of these relationships while accounting for other influencing factors.

5.5 Multicollinearity Check

Multicollinearity occurs when independent variables in a regression model are correlated. To evaluate this issue, we calculated the Variance Inflation Factor (VIF) for each model. A VIF of 1 indicates no correlation, while values above 10 suggest high correlation and potential problems with the model (Hair, et al., 2009). The VIF results are presented in Table 11. Since all VIF values ranged from 1.02 to 1.07, none of the models exhibit signs of multicollinearity.

Table 11 Variation Inflation Factor

Model	Mean VIF
Model 1	1.07
Model 2	1.07
Model 3	1.07
Model 4	1.02
Model 5	1.02
Model 6	1.02

5.6 Heteroscedasticity Tests

The classical linear regression model assumes that the error terms, or disturbances, are homoscedastic. That is, they have constant or similar variances across all observations. Heteroscedasticity occurs when the variance of the error terms varies across observations, which can lead to biased standard errors and inefficient estimators (Brooks, 2014). To verify the validity of the regression models, we performed heteroscedasticity tests using the Breusch-Pagan test. The results for the six models are summarised in Table 12. Since all p-values were greater than 0.05, we did not find evidence to support the presence of heteroscedasticity.

Table 12 Heteroscedasticity Tests

Model	p value
Model 1	0.619
Model 2	0.526
Model 3	0.087
Model 4	0.396
Model 5	0.884
Model 6	0.229

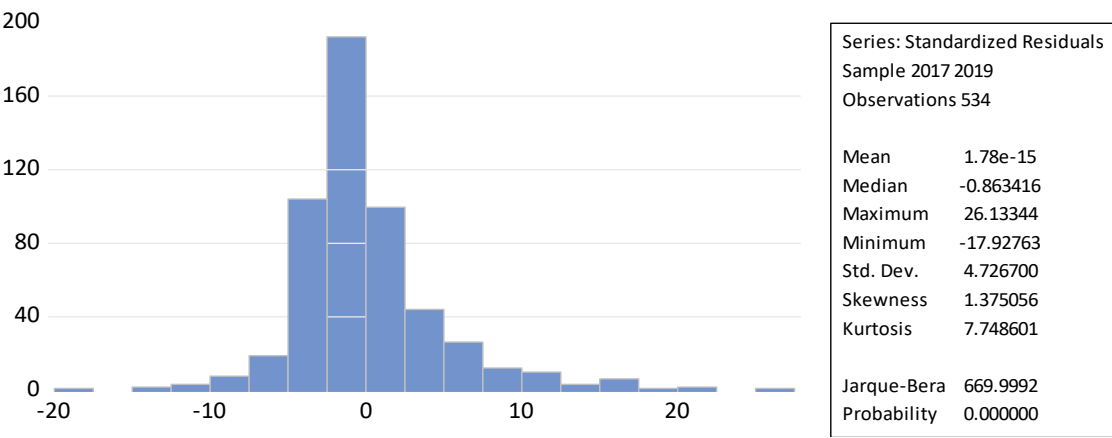
5.7 Assessing Normality

Assessing the normality of residuals is essential in regression analysis because it influences the validity of hypothesis tests and confidence intervals. Typically, normality is evaluated using skewness and kurtosis statistics. Skewness measures the asymmetry of a distribution. For a normal distribution, skewness should be close to zero, indicating symmetry around the mean. Positive skewness suggests a longer right tail, while negative skewness indicates a longer left tail. Generally, skewness values between -0.5 and 0.5 are considered approximately symmetric; larger deviations point to significant asymmetry, indicating a departure from normality (Kim, 2013). Kurtosis assesses the presence of outliers and the shape of the distribution's tails. A normal distribution has a kurtosis of 3 (excess kurtosis of 0). Distributions with kurtosis greater than 3 are leptokurtic, characterized by a sharp peak and heavy tails, indicating more extreme outliers. Conversely, kurtosis less than 3 is platykurtic, reflecting flatter shapes with lighter tails (Kim, 2013). Significant deviations from 3 suggest the data deviate from normality, often due to outliers or a less peaked distribution. The histograms of

the residuals for each model, along with their key skewness and kurtosis statistics are shown in Figures 2 to 7.

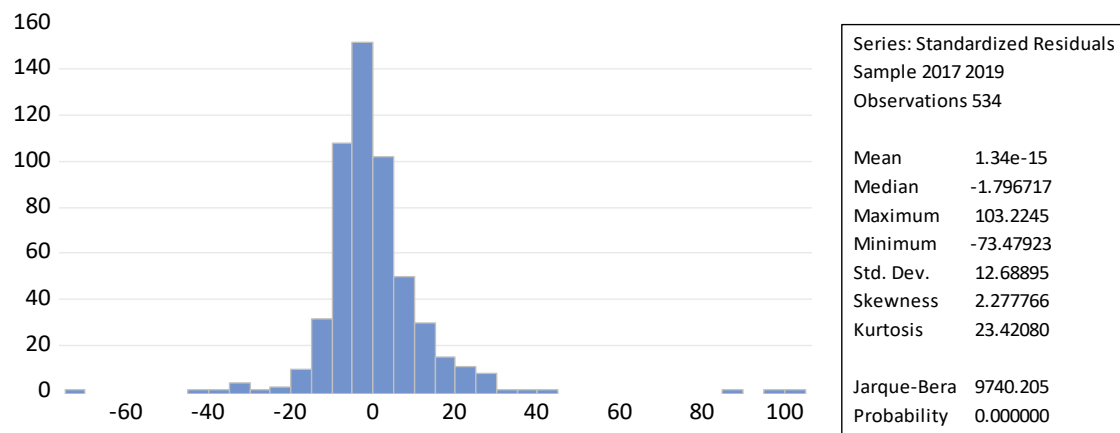
Model 1: Figure 2 shows that the distribution had a mean of 1.78×10^{-15} and a standard deviation of 4.72. The skewness was 1.38, indicating a moderate to high positive skew, and the kurtosis was 7.75, suggesting a leptokurtic distribution with heavier tails than a normal distribution. For a normal distribution, skewness should be close to 0 and kurtosis near 3 (Kim, 2013). Based on these statistics, particularly the skewness and kurtosis values, the distribution appears to deviate from normality. The substantial skewness and elevated kurtosis suggest that the data are not approximately normally distributed.

Figure 2: Histogram of the Error Terms of Model 1 (ROA with ESGP and ESGD)



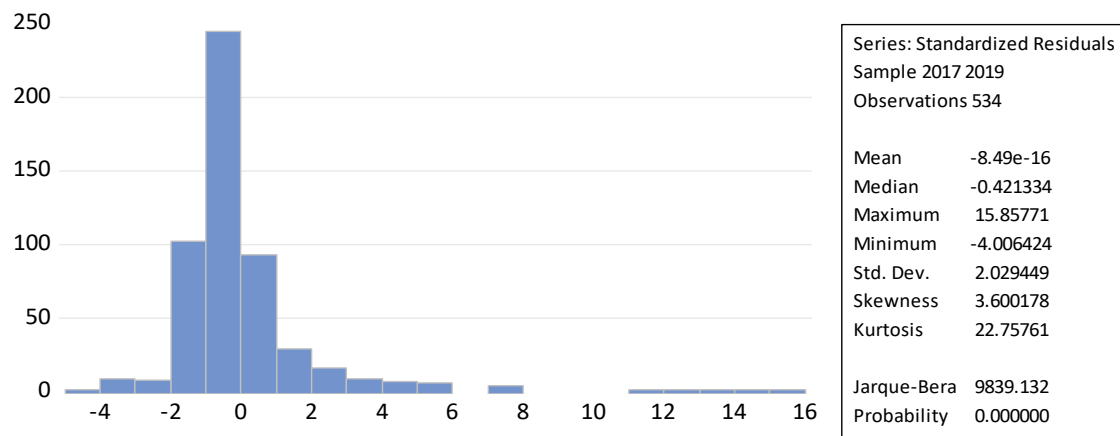
Model 2: The distribution in Figure 3 had a mean of 1.34×10^{-15} , a standard deviation of 12.69, a skewness of 2.28, and a kurtosis of 23.42. Since both skewness and kurtosis statistics values fell beyond the satisfactory range, it is not approximately normal, exhibiting heavy-tailed, asymmetric characteristics.

Figure 3: Histogram of the Error Terms of Model 2 (ROE with ESGP and ESGD)



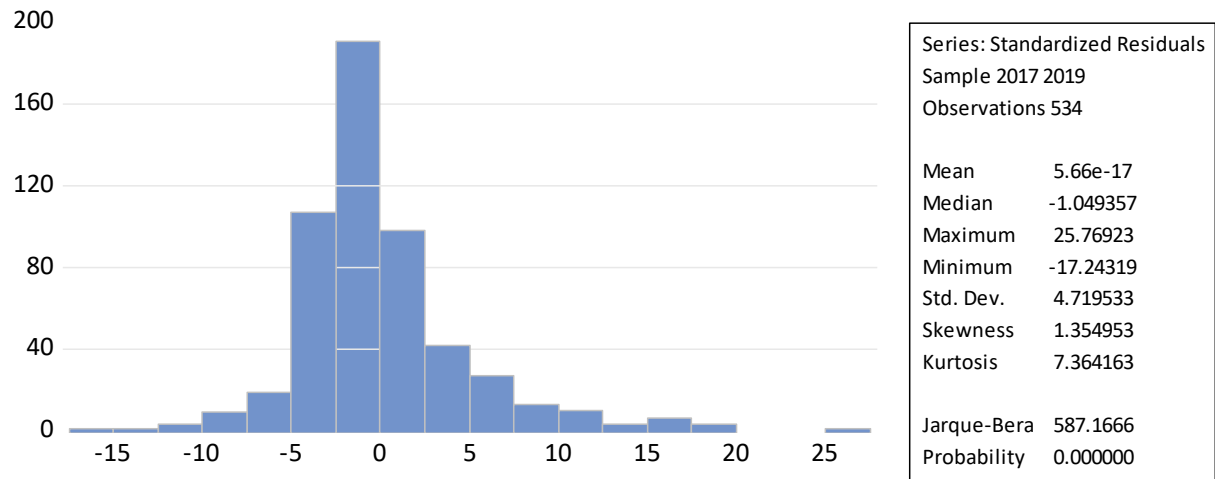
Model 3: The distribution in Figure 4 had a mean of -8.9×10^{-16} and a standard deviation of 2.10. The skewness was 3.60, indicating a high positive asymmetry, and the kurtosis was 22.76, suggesting a heavy-tailed distribution with more extreme values than a normal distribution. Based on these statistics, particularly the substantial skewness and elevated kurtosis, the distribution does not appear to be approximately normal. The data exhibit significant deviations from normality, characterized by pronounced asymmetry and heavy tails.

Figure 4: Histogram of the Error Term of Model 3 (EPS with ESGP and ESGD)



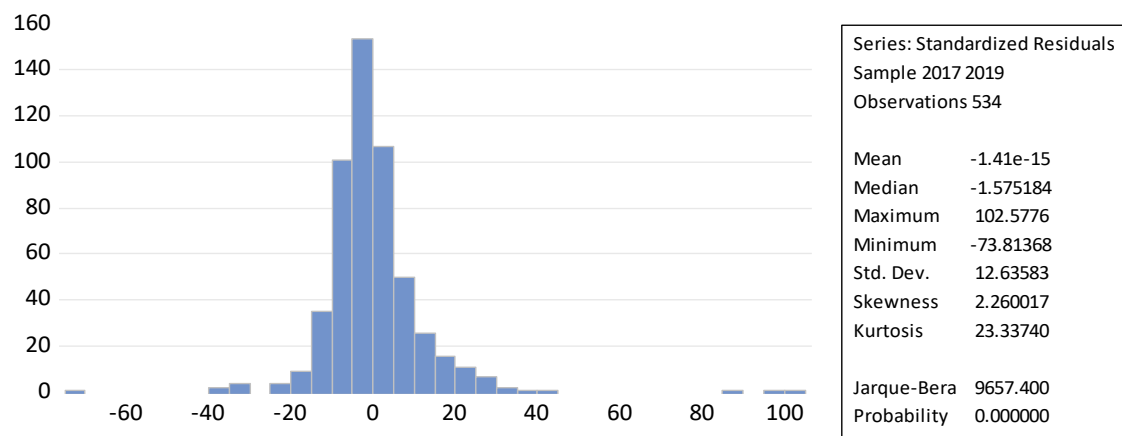
Model 4: Figure 5 shows that the distribution had a mean of 5.66×10^{-17} and a standard deviation of 4.72. The skewness was 1.35, indicating a moderate to high positive skew, and the kurtosis was 7.36, suggesting a leptokurtic distribution with heavier tails than a normal distribution. Based on these statistics, particularly the skewness and kurtosis values, the distribution appears to deviate from normality. The substantial skewness and elevated kurtosis suggest that the data are not approximately normally distributed.

Figure 5: Histogram of the Error Terms of Model 4 (ROA with EP SP and GP)



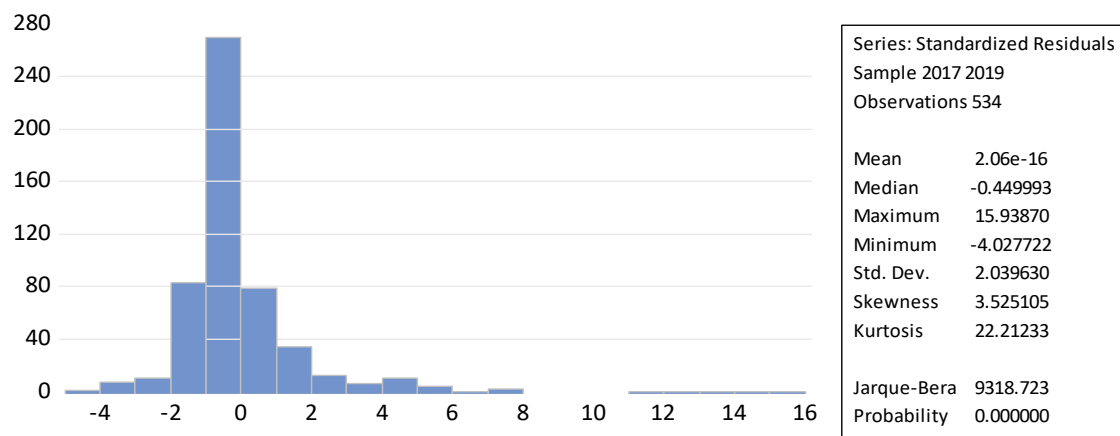
Model 5: The distribution in Figure 6 had a mean of -1.4×10^{-15} , a standard deviation of 12.64, skewness of 2.26, and kurtosis of 23.33. The mean is extremely close to zero, while the standard deviation indicates moderate variability. However, the skewness of 2.26 suggests a strong positive skew, with a long right tail, and the kurtosis of 23.33 indicates a highly leptokurtic shape, with heavy tails and extreme outliers. For a normal distribution, skewness should be near 0 and kurtosis close to 3, but these values deviate significantly. Therefore, the distribution is not approximately normal, showing asymmetry and heavy-tailed behaviour.

Figure 6: Histogram of the Error Terms of Model 5 (ROE with EP SP and GP)



Model 6: Figure 7 shows that the distribution had a mean of 2.06×10^{-16} and a standard deviation of 2.40. The skewness was 3.52, indicating a high positive skew, and the kurtosis was 22.21, suggesting a heavy-tailed distribution with numerous extreme values. Given the substantial skewness and high kurtosis, the distribution does not appear to be approximately normal. These statistics indicate significant deviations from normality, characterized by pronounced asymmetry and heavy tails.

Figure 7: Histogram of the Error Terms of Model 6 (EPS with EP SP and GP)



The Shapiro-Wilk test for normality was also conducted on the residuals for each model. All p-values were less than 0.05, indicating that the residuals are not normally distributed. These results align with the findings from Figures 2 to 7. According to Stock and Watson (2020), the normality of residuals is not a requirement for the Ordinary Least Squares (OLS) estimates to be unbiased or consistent. Normality mainly facilitates statistical inference, such as hypothesis testing and confidence intervals. Furthermore, when the sample size is large, the Central Limit Theorem ensures that the sampling distribution of OLS estimates is approximately normal, even if the error terms are not normally distributed (Greene, 2018). Therefore, strict normality of residuals is not essential for regression analysis, especially with large samples. With over 500 observations in this study, the sampling distribution of the residuals is expected to be normal, eliminating the need for data transformation.

5.8 Comparisons of ESG Performance Across Sectors

Different economic sectors face unique environmental, social, and governance (ESG) challenges. Comparing their ESG performance provides valuable insights into sector-specific contributions to sustainability. Table 13 presents the mean scores for ESG disclosure, along with overall and individual ESG performance for the four sectors, accompanied by ANOVA results.

Table 13: Mean Scores for ESG Disclosure, Overall and Individual ESG Performance

	Property Development (1)		Public Transport (2)		Utilities (3)		Catering (4)		F value	p value	Games-Howell Post-Hoc Test
	N=47		N=42		N=40		N=49				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
ESGD	49.02	8.73	47.54	9.26	49.36	9.50	46.71	8.23	2.76	0.043	ND*
ESGP	2.70	1.28	3.03	1.46	3.33	1.25	2.68	1.540	6.96	< .001	3 > 1,4
EP	3.14	1.50	3.41	1.74	3.67	1.28	3.16	1.54	4.18	0.006	3 > 1,4
SP	3.68	1.15	3.59	1.26	3.93	0.94	3.41	1.36	5.02	0.002	3 > 4
GP	3.40	1.12	4.11	1.42	3.66	0.86	3.86	1.07	8.04		2 > 1,3; 4 > 1

* No pairwise differences were detected.

A significant difference was found among sectors for overall ESG performance. Post-hoc analysis using the Games-Howell test revealed that the Utilities sector (mean = 3.33, SD = 1.25) scored significantly higher than both the Property Development sector (mean = 2.70, SD = 1.28) and the Catering sector (mean = 2.68, SD = 1.54). For environmental performance, a significant difference was also observed, with the Utilities sector (mean = 3.67, SD = 1.28) outperforming the Property Development sector (mean = 3.14, SD = 1.50) and the Catering sector (mean = 3.16, SD = 1.54). Social performance similarly showed significant differences across sectors. The Utilities sector (mean = 3.93, SD = 0.94) demonstrated significantly higher social performance than the Catering sector (mean = 3.41, SD = 1.36). Governance

performance displayed the most notable differences, with the Public Transport sector (mean = 4.11, SD = 1.42) scoring significantly higher than both the Property Development sector (mean = 3.40, SD = 1.12) and the Utilities sector (mean = 3.66, SD = 0.86). Additionally, the Catering sector (mean = 3.86, SD = 1.07) scored higher than the Property Development sector in governance performance.

The F-value for ESG disclosure (ESGD) was significant ($p = 0.043$) but the Games-Howell post-hoc test did not reveal any significant pairwise differences between the sector means. This could be due to the fact that the differences between the sectors are too small or inconsistent (relative to within-group variability) to be statistically significant (Chen, et al., 2018). This result highlights the importance of interpreting ANOVA results alongside post-hoc tests to gain a clear understanding of the data.

Because the tests of homogeneity indicated unequal variances, we employed the Games–Howell post hoc test to examine pairwise differences. Unlike Tukey’s HSD, Games–Howell does not assume equal variances or equal sample sizes and uses Welch–Satterthwaite adjustments to maintain Type I error rates. These findings suggest that ESG performance varies significantly among sectors, with the Utilities sector consistently achieving higher scores in overall ESG performance, environmental performance, and social performance. Public Transport demonstrated the strongest governance performance. These differences likely reflect sector-specific factors such as regulatory requirements, stakeholder expectations, and resource allocation priorities.

5.9 Results of Panel Data Analyses

After completing the correlation analysis which provided initial insights into the

relationships between variables, and conducting the assumption tests, we now move forward with regression analyses. These analyses will enable us to test our hypotheses while controlling for other relevant factors.

Model Design and Variable Grouping

This study examines three dependent variables that represent companies' short-term accounting performance: return on assets (ROA), return on equity (ROE), and earnings per share (EPS). For each of these performance measures, we estimated two different models, each based on different sets of ESG predictors:

- Predictor Set 1: This set includes ESG disclosure (ESGD) and overall ESG performance (ESGP). It assesses whether the breadth or depth of ESG reporting, along with overall ESG practices, is associated with financial outcomes.
- Predictor Set 2: This set comprises environmental performance (EP), social performance (SP), and governance performance (GP). It tests whether strengths in specific ESG domains are related to firm performance when modelled together.

Selection of Estimation Methods

As previously mentioned, three estimation methods are available in panel data regression. These include the pooled Ordinary Least Squares model (OLS), the fixed effects model (FEM) and the random effects model (REM). The researcher initially employed the OLS regression method and Breusch-Pagan Lagrange Multiplier Tests to determine whether OLS remained appropriate or if FEM or REM would be better suited. The results of Breusch-Pagan Lagrange multiplier tests (see Table 14) indicated that

the random effects model (REM) was more appropriate than pooled Ordinary Least Squares model (OLS) in all cases.

Table 14 Breusch-Pagan Lagrange Multiplier Tests

Model	Chilbar2	p-value
Model 1	299.40	0.00
Model 2	204.70	0.00
Model 3	397.90	0.00
Model 4	297.08	0.00
Model 5	200.28	0.00
Model 6	395.40	0.00

Following this, Hausman tests were conducted to justify the choice between the random and fixed effects model (FEM) and the random effects model (REM). As shown in Table 15, the p-values from all Breusch-Pagan tests exceeded <0.05 , confirming that random effects model (REM) was the most suitable approach.

Table 15 Hausman Test

Model	p-value	Suggested Model
Model 1	0.60	REM
Model 2	0.35	REM
Model 3	0.43	REM
Model 4	0.68	REM
Model 5	0.07	REM
Model 6	0.34	REM

Analytical Approach and Significance Criteria

To evaluate whether ESG factors are related to firm performance, we estimated a series of panel regression models using firm-year observations. Panel data methods allow us to account for unobserved and time-invariant characteristics specific to each firm and to leverage both cross-sectional and longitudinal variation in the data. All statistical inferences were made at the 95% confidence level.

Specifically, p-value below 0.05 as considered evidence of a statistically significant association between an ESG variable (independent variable) and a financial performance measure (dependent variable). A significant coefficient, whether positive or negative, indicates that changes in the ESG variable are systematically related to changes in firm performance, assuming factors are held constant. Coefficients with p-values at or above 0.05 were regarded as not statistically significant and were not over-interpreted. Each model was estimated separately to identify whether any ESG variable exhibits a significant relationship with financial outcomes. The Eviews outputs of all six models are shown in Appendices 1 to 6.

5.9.1 Model 1

This regression model seeks to examine the impact of ESG performance (ESGP) and ESG disclosure (ESGD) on firm performance reflected in ROA.

$$ROA_{it} = \alpha + \beta_1 ESGD_{it} + \beta_2 ESGP_{it} + \beta_3 IOB_{it} + \beta_4 SIZE_{it} + \varepsilon_{it} \text{ (Model 1)}$$

The results presented in Table 16 indicate that none of the independent variables were statistically significant at the 95% confidence level. The p values of ESGD and ESGP were 0.152 and 0.089 respectively. Since all these p values were higher than the 0.05

threshold, we cannot reject the null hypothesis at this confidence level. Consequently, the findings suggest that both hypotheses H1a and H2a were not supported at the 0.05 significance level.

The R squared value shows that ESGP and ESGD together explained 3.45% of the variance in ROA. This indicates that a significant portion of the variability in ROA remains unexplained by the model. These findings are consistent with the research by Tarmuji, Maelah, and Tarmuji (2016), who also observed limited ESG impact on financial performance measures. In contrast, firm size, as measured by market capitalization, demonstrates a significant relationship with ROA at the 0.05 level. This suggests that larger firms tend to have different ROA profiles. Further research is necessary to better understand the nature of this relationship.

Table 16 Panel Data Regression Results – Models 1 to 3

	Model 1			Model 2			Model 3		
	ROA			ROE			EPS		
Variables	β	t-Statistic	p value	β	t-Statistic	p value	β	t-Statistic	p value
Constant	5.1399	3.3842	0.0008	16.285	3.9014	0.0001	-0.099	-0.1657	0.8685
Independent variables									
ESGD	-0.04	-1.4344	0.1520	-0.042	-0.5288	0.5972	0.0113	1.1315	0.2584
ESGP	-0.177	-1.7038	0.0890	-0.308	-0.9245	0.3556	-0.108	-3.2132	0.0014
Control variables									
Firm Size	0.725	3.8876	0.0001	0.6511	1.3661	0.1725	0.3969	4.8038	0.0000
IOB	0.0889	0.4621	0.6442	-0.623	-1.2746	0.2030	0.0428	0.4974	0.6191
R-squared	0.0346			0.0083			0.0638		
Adjusted R-squared	0.0272			0.0008			0.0567		
F-statistic	4.7369			1.108			9.0063		

5.9.2 Model 2

This regression model seeks to examine the impact of ESG performance (ESGP) and ESG disclosure (ESGD) on firm performance reflected in ROE.

$$ROE_{it} = \alpha + \beta_1 ESGD_{it} + \beta_2 ESGP_{it} + \beta_3 IOB_{it} + \beta_4 SIZE_{it} + \varepsilon_{it} \text{ (Model 2)}$$

As shown in Table 16, none of the independent variables in Model 2 were statistically significant in relation to ROA at the 95 percent confidence level. The p-value for ESG disclosure (ESGD) is 0.60, and the p-value for overall ESG performance (ESGP) was 0.36. Since all these p-values exceed both 0.05, we cannot reject the null hypothesis at the 95 percent confidence level. Therefore, the results indicate that hypotheses H1b and H2b are not supported.

These findings suggest that the market's valuation of companies, as reflected in return on equity (ROE), is not significantly influenced by their ESG performance or disclosure practices. The results contradict expectations from signalling theory, which posits that companies' sustainable development activities and sustainability reporting should send positive signals to the market. However, in this study, such ESG-related signals do not appear to generate a positive market response as measured by ROE.

5.9.3 Model 3

This regression model seeks to examine the impact of ESG performance (ESGP) and ESG disclosure (ESGD) on Firm performance reflected in EPS.

$$EPS_{it} = \alpha + \beta_1 ESGD_{it} + \beta_2 ESGP_{it} + \beta_3 IOB_{it} + \beta_4 SIZE_{it} + \varepsilon_{it} \text{ (Model 3)}$$

The results of Model 3 are presented in Table 16. Both ESG performance (ESGP) and firm size showed a significant relationship with earnings per share (EPS), while ESG disclosure (ESDG) was not significant. These findings support Hypothesis H2c but do not support H1c. Interestingly, the relationship between ESGP and EPS was significant but negative. The reasons for this negative association are unclear, but companies heavily investing in ESG initiatives might face short-term costs that reduce EPS despite potential long-term gains. Market participants might also undervalue ESG efforts, prioritizing immediate financial returns over sustainability initiatives.

5.9.4 Model 4

This regression model seeks to examine the impact of environmental performance (EP), social performance (SP), and governance performance (GP) on firm performance reflected in ROA.

$$ROA_{it} = \alpha + \beta_1 EP_{it} + \beta_2 SP_{it} + \beta_3 GP_{it} + \beta_4 IOB_{it} + \beta_5 SIZE_{it} + \varepsilon_{it} \text{ (Model 4)}$$

As shown in Table 17, none of the independent variables in Model 4 were statistically significant in relation to return on assets (ROA) at the 95 percent confidence level. The p-values for environmental performance (EP), social performance (SP), and governance performance (GP) were 0.091, 0.942, and 0.607, respectively. Since all these p-values exceed 0.05, hypotheses H2a, H3a, and H4a are not supported. These findings contrast with previous studies that reported significant links between ESG performance and ROA (Jo and Harjoto, 2011; Servaes and Tamayo) However, they

align with the research by Ahmed, Islam, and Hasan (2012), which found no relationship between corporate social responsibility and ROA. The lack of significance may be due to the fact that the benefits of ESG initiatives often develop over the long term, while ROA measures short-term financial performance.

Table 17 Panel Data Regression Results – Models 4 to 6

	Model 4			Model 5			Model 6		
	ROA			ROE			EPS		
Variables	β	t-Statistic	p value	β	t-Statistic	p value	β	t-Statistic	p value
Constant	3.164	2.6035	0.0095	12.548	3.7725	0.0002	0.1	0.2026	0.8395
Independent variables									
EP	-0.146	-1.6927	0.0911	-0.248	-0.9088	0.3639	-0.024	-0.8517	0.3948
SP	0.0086	0.0727	0.9421	0.186	0.5002	0.6171	0.0397	1.0234	0.3066
GP	0.0654	0.514	0.6074	0.3641	0.9121	0.3621	0.0187	-0.4474	0.6548
Control variables									
Firm Size	0.6725	3.6511	0.0003	0.5741	1.2454	0.2135	0.4003	4.8618	0.0000
IOB	0.0599	0.3124	0.7549	-0.676	-1.4725	0.1584	0.0498	0.5757	0.5650
R-squared	0.0319			0.0106			0.0491		
Adjusted R-squared	0.0227			0.0012			0.0401		
F-statistic	3.4774			1.1284			5.4481		

5.9.5 Model 5

This regression model seeks to examine the impact of environmental performance (EP), social performance (SP) and governance performance (GP) on firm performance reflected in ROE.

$$ROE_{it} = \alpha + \beta_1 EP_{it} + \beta_2 SP_{it} + \beta_3 GP_{it} + \beta_4 IOB_{it} + \beta_5 SIZE_{it} + \varepsilon_{it} \text{ (Model 5)}$$

The results presented in Table 17 show that ROE was not significantly related to any

of the independent or control variables in Model 5 at the 95% confidence level. The p-values for environmental performance (EP), social performance (SP), and governance performance (GP) were 0.364, 0.617, and 0.362, respectively. Since all these p-values exceed 0.05, hypotheses H3b, H4b, and H5b are not supported. This pattern of non-significance is consistent across all individual ESG components, indicating a uniform lack of influence on ROE. These findings suggest that the market's valuation of companies, as reflected in ROE, is not significantly affected by their participation in sustainable development activities. This could imply that investors are not currently factoring ESG performance into their valuation models or investment decisions in a way that substantially impacts ROE.

5.9.6 Model 6

This regression model seeks to examine the impact of environmental performance (EP), social performance (SP) and governance performance (GP) on firm performance reflected in earnings per share (EPS).

$$EPS_{it} = \alpha + \beta_1 EP_{it} + \beta_2 SP_{it} + \beta_3 GP_{it} + \beta_4 IOB_{it} + \beta_5 SIZE_{it} + \varepsilon_{it} \text{ (Model 6)}$$

Table 17 indicates that none of the independent variables in Model 6 were statistically significant in relation to earnings per share (EPS) at the 95% confidence level. The p-values for environmental performance (EP), social performance (SP), and governance performance (GP) were 0.39, 0.31, and 0.65, respectively. Since all these p-values exceed 0.05, hypotheses H3c, H4c, and H5c are not supported. While these findings align with Velte (2017), who reported no significant relationship between ESG scores and Tobin's Q, they contrast with prior studies (Waddock, S.A. and Graves, S.B.

(1997))that identified significant links. This may suggest that ESG initiatives are not effectively translated into measurable firm performance or are not sufficiently valued by investors.

5.10 Hypotheses Testing Results

Table 18 summarizes the results of the hypothesis testing. Specifically, all six hypotheses, except for sub-hypothesis H2c, were not supported. The study did not find any significant relationships between ESG factors and financial performance measures such as ROA, ROE, and EPS. The only exception was a negative association between ESGP and EPS, which highlights the complexity of how ESG initiatives are perceived and valued by stakeholders.

The study found that neither ESGP nor ESGD had a statistically significant effect on ROA. This suggests that ESG initiatives and disclosures do not meaningfully influence ROA. Additionally, when examining EP, SP, and GP, none showed significant relationships. These results imply that a significant portion of ROA variability remains unexplained by ESG factors, aligning with previous research that reported limited ESG impact on financial performance (Tarmuji, Maelah, and Tarmuji, 2016).

Similarly, the analysis indicated that ESGP and ESGD did not significantly influence ROE. This lack of significance suggests that the market's valuation of companies, as reflected in ROE, is not affected by their ESG practices. The findings contradict signalling theory, which posits that strong ESG performance should send positive signals to the market. The study reinforces the notion that investors may not currently consider ESG factors in their valuation models.

The relationship between ESGP and EPS was notable, as it showed a significant but negative correlation, indicating that firms heavily investing in ESG initiatives may experience short-term costs that adversely impact EPS. This suggests that while ESG investments may lead to long-term benefits, they can initially detract from immediate earnings, reflecting a potential undervaluation by market participants who prioritize short-term financial returns over sustainability efforts. While ESGP did not have a significant impact on EPS, firm size was found to have a meaningful relationship with it. This is intuitive because larger firms typically benefit from economies of scale and stronger market positions, which result in lower per-unit costs and higher profitability.

Table 18 Summary of Hypothesis Testing Results

Hypothesis	Result
H1a: There is a positive association between ESG disclosure and firm performance, as measured by ROA	Not supported
H1b: There is a positive association between ESG Disclosure and firm performance as measured by ROE	Not supported
H1c: There is a positive association between ESG Disclosure and firm performance as measured by EPS	Not supported
H2a: There is a positive association between overall ESG performance and firm performance as measured by ROA	Not supported
H2b: There is a positive association between overall ESG performance and firm performance as measured by ROE	Not supported
H2c: There is a positive association between overall ESG performance and firm performance as measured by EPS	Supported
H3a: There is a positive association between Environmental performance and firm performance as measured by ROA	Not supported
H3b: There is a positive association between Environmental performance and firm performance as measured by ROE	Not supported
H3c: There is a positive association between Environmental performance and firm performance as measured by EPS	Not supported
H4a: There is a positive association between social performance and firm performance as measured by ROA	Not supported
H4b: There is a positive association between social performance and firm performance as measured by ROE.	Not supported
H4c: There is a positive association between social performance and firm performance as measured by EPS.	Not supported
H5a: There is a positive association between governance performance and firm performance as measured by ROA.	Not supported
H5b: There is a positive association between governance performance and firm performance as measured by ROE.	Not supported
H5c: There is a positive association between governance performance and firm performance as measured by EPS.	Not supported

5.11 Chapter Summary

This chapter presents and interprets the empirical results for Hong Kong-listed firms across four sectors from 2017 to 2019. The analysis reveals that neither ESG disclosure nor overall ESG performance predicts short-term financial performance. Notably, an unexpected negative relationship between overall ESG performance and EPS stands out. When examined individually, the separate components of ESG do not demonstrate significant relationships with ROA, ROE, or EPS. In contrast, firm size is positively related with both ROA and EPS.

CHAPTER SIX

CONCLUSIONS

6.1 Introduction

This study investigates the relationship between environmental, social, and governance (ESG) disclosure and performance, and accounting-based financial performance among companies listed in Hong Kong. Focusing on four sectors—property development, public transport, public utilities, and catering—data was collected for the period from 2017 to 2019. A balanced panel of 178 firms, encompassing 534 firm-years, was analysed using two sets of models, one incorporating ESG disclosure (ESGD) and overall ESG performance (ESGP), and another disaggregating ESG into its individual components (EP, SP and GP).

The analysis employed random effects panel regressions, complemented by Lagrange Multiplier and Hausman tests, while also conducting routine diagnostics for outliers, multicollinearity, heteroscedasticity, and residual properties. Additionally, sectoral differences in ESG practices were assessed using one-way ANOVA with Games-Howell post hoc comparisons.

6.2 Discussion of Empirical Findings

The findings indicate that ESG disclosure (ESGD) did not have a statistically significant relationship with any financial metrics. While overall ESG performance (ESGP) showed no significant link with ROA or ROE, it was negatively associated with EPS. Additionally, none of the individual ESG components—environmental performance (EP), social performance (SP), or governance performance (GP)—significantly explained variations in ROA, ROE, or EPS. These results remained

consistent across all model specifications, even after controlling for firm size and board independence (IOB). Notably, firm size was positively correlated with ROA and EPS, whereas board independence did not show a direct relationship with accounting performance. Finally, although the utilities sector led in overall ESG performance, particularly in environmental and social components, these leading positions did not translate into consistent short-term accounting outperformance.

Research question 1: How do ESG performance and disclosure influence the financial performance of Hong Kong's listed companies in the property development, transport, public utilities and catering sectors?

The first research question explored how ESG performance and disclosure influence the financial performance of Hong Kong's listed companies within the specified sectors. The analysis revealed that ESG disclosure, as measured by Bloomberg's ESGD score, did not significantly correlate with ROA, ROE, or EPS. This finding suggests that transparency, in the absence of demonstrable operational improvements or effective risk management, did not yield near-term accounting benefits during the study period. Conversely, the overall ESG performance score (ESGP) exhibited no relationship with ROA or ROE but was negatively correlated with EPS. This pattern aligns with the transition cost hypothesis, positing that in the initial stages of ESG formalization, firms incur costs related to compliance, systems integration, personnel training, and process redesign (Kus and Jackson, 2025). Consequently, the benefits—such as efficiency gains, enhanced reputation, and improved financing conditions—take longer to materialize. Given that EPS reflects contemporaneous earnings and share dynamics, it is more sensitive to short-term costs than ROA or ROE, which incorporate earnings alongside asset base and equity stewardship. Importantly, the negative association should not be

interpreted as evidence that ESG initiatives destroy value; rather, it serves as a caution against assuming immediate earnings growth from comprehensive ESG programs implemented over short horizons.

Research question 2: How do individual ESG components (environmental, social, and governance) influence companies' financial performance?

The second research question investigated whether the environmental, social, and governance components influence financial performance. Across all models, none of the pillars significantly explained variations in ROA, ROE, or EPS. Several mechanisms could account for these null results. Disaggregating ESG may dilute the signal due to measurement error and heterogeneity, particularly when the quality of indicators varies across firms and over time. Many initiatives related to these pillars are inherently long-term, such as capital expenditures for decarbonization, safety culture programs, and governance reforms, and are not expected to impact short-term accounting aggregates in a statistically detectable manner. Furthermore, the study period coincided with a phase of ESG formalization in Hong Kong, characterized by compliance-oriented practices that may have diminished their short-term operational effects.

Research question 3: What are the sectoral differences in ESG practices across the 4 sectors?

The third research question examined sectoral differences in ESG practices across the focal sectors. The comparative analysis demonstrated that the utilities sector led in overall ESG performance as well as in environmental and social dimensions, while the public transport sector excelled in governance. Conversely, the property and catering

sectors generally lagged across several ESG dimensions. These differences reflect the materiality profiles of each sector and the intensity of regulatory obligations: utilities and transport are subject to stricter environmental and public interface requirements, whereas property and catering have historically faced more variable and evolving ESG expectations. Importantly, however, the higher ESG performance in utilities and public transport did not systematically correspond to superior short-term accounting outcomes during the study period, reinforcing the notion that the benefits of ESG investments may be realized with lags and through channels—such as cost of capital and resilience to external shocks—that are not fully captured by traditional accounting metrics like ROA, ROE, and EPS.

6.3 Theoretical Implications

From a stakeholder theory perspective, the lack of significant impact of ESG performance (ESGP) and ESG disclosure (ESGD) on ROA suggests that companies may prioritize short-term financial objectives over broader stakeholder interests. While ESG initiatives can benefit various stakeholders, such as employees, customers, and the community, the immediate financial metrics like ROA may not reflect these long-term benefits. This misalignment indicates that firms might not fully embrace stakeholder interests, leading to an underestimation of the value generated by robust ESG practices.

The findings regarding ROE further illustrate stakeholder theory's implications. The non-significant relationship between ESG factors and ROE indicates that investors—often focused primarily on short-term returns—may overlook the potential benefits of strong ESG practices. Stakeholder theory emphasizes that a firm's commitment to sustainability and ethical practices can enhance its reputation and stakeholder relationships, ultimately leading to long-term value creation. However, if the market

does not recognize or reward these efforts, firms may struggle to align their strategic goals with stakeholder expectations, resulting in a disconnect between ESG performance and financial metrics.

The negative relationship between ESG performance and earnings per share (EPS) provides a compelling insight from the stakeholder theory perspective. Companies that invest heavily in ESG initiatives might incur short-term costs, which could depress EPS despite potential long-term gains. This underscores the challenge of balancing stakeholder interests with immediate financial performance. Stakeholder theory suggests that while companies should engage in sustainable practices for the benefit of all stakeholders, the financial markets may not yet fully appreciate or reward these long-term investments. As a result, firms prioritize immediate financial returns, potentially leading to undervaluation of their ESG efforts.

Overall, the study's findings illustrate the complexities inherent in stakeholder theory. While ESG initiatives are designed to create value for a broad range of stakeholders, their benefits may not be immediately visible in traditional financial metrics like ROA, ROE, and EPS. This disconnect highlights the need for a cultural shift in how companies communicate their ESG efforts and for investors to recognize the long-term value of sustainability practices. By aligning corporate strategies with stakeholder interests, firms can better leverage their ESG initiatives to enhance overall financial performance and stakeholder satisfaction.

6.4 Managerial Implications

For corporate leaders, the principal managerial lesson is to prioritize ESG initiatives that demonstrate clear operational linkages. Rather than pursuing score maximization, firms should select projects that directly impact margins, cash conversion, asset efficiency, and downside risk mitigation. Examples include energy efficiency programs linked to cost of goods sold, safety initiatives aimed at reducing downtime and claims, and supply chain governance practices that minimize disruption risks. These initiatives should be monitored using decision-relevant key performance indicators (KPIs), integrated into budgeting and capital allocation processes, and aligned with management incentives.

Additionally, organizations should proactively manage the ESG transition cost curve by staging investments, communicating realistic payback periods, and aligning compensation with credible transition roadmaps. This approach can help mitigate short-term EPS fluctuations that might undermine support for strategically sound programs. The quality and assurance of measurement are also vital; outcome-oriented, sector-specific metrics—such as emissions intensity, lost time injury rates, and incidence of audit deficiencies—are more informative than mere disclosure volume and should be subject to external assurance to enhance credibility. Finally, governance should extend beyond board composition; boards should assign explicit ownership of ESG risks, require scenario analyses and stress testing, and integrate ESG considerations into capital budgeting and the firm's risk appetite framework. The importance of an independent board is crucial to ensuring the effective implementation of ESG initiatives, such as climate change policies.

6.5 Implications for Policymakers and Investors

For regulators and policymakers, the findings advocate for continued alignment with the International Sustainability Standards Board (ISSB) and the Task Force on Climate-related Financial Disclosures (TCFD), emphasizing sector-specific, outcome-oriented disclosures that enhance decision usefulness and comparability. Encouraging or mandating assurance on core ESG indicators would mitigate measurement noise and reduce the risks of greenwashing, thus enabling markets to better price ESG substance. Additionally, sectoral guidance can align disclosures with financially material aspects relevant to each industry.

For investors, a clear implication is the need to differentiate between disclosure and performance, incorporating timing and implementation risks into valuation models. Investors should also account for longer-term channels—such as cost of equity and debt, resilience to market downturns, and exposure to regulatory shocks—alongside traditional accounting metrics. Engagement with issuers should focus on capital allocation to material ESG projects that demonstrate robust return on investment logic, credible interim targets, and transparent governance of execution.

6.6 Recommendations

Based on the evidence and its interpretation, several practical recommendations emerge. Companies should integrate ESG considerations into their strategic planning and capital budgeting processes, ensuring explicit analyses of return on investment, risk, and payback periods, with a focus on sector-specific initiatives rather than broad score-seeking endeavours. Reporting should prioritize assured, comparable outcome metrics and adopt a balanced scorecard approach that integrates financial and ESG KPIs into

performance management frameworks. Executive incentives should align with material ESG outcomes and long-term value creation.

Investors should evaluate ESG through the lens of cash flow and risk channels, requiring credible transition plans with interim targets while differentiating between disclosure-led and performance-led ESG efforts. Dialogue with issuers should emphasize measurement quality and disciplined capital allocation. Regulators should continue to align with ISSB and TCFD standards, mandating or encouraging assurance for key metrics, and providing sectoral guidance. Transitional incentives, such as tax credits for efficiency-related capital expenditures, could alleviate short-term earnings pressure and accelerate ESG adoption. Rating agencies should enhance transparency in their methodologies and refine sector-specific materiality weights. Finally, researchers and practitioners should collaborate to connect ESG implementation quality with financial outcomes through mixed-method approaches.

6.7 Limitations and Further Research

Several limitations must be acknowledged when interpreting the findings of this study. First, the three-year observation window constrains the ability to detect lagged ESG effects that may arise through channels such as financing costs, reputation, and resilience. Consequently, the results should be considered as indicative of short-term accounting outcomes during a period of regulatory transition rather than reflecting the full spectrum of ESG value creation. Second, measurement limitations stem from reliance on a single ESG data provider, whose methodology may introduce disclosure and aggregation biases, and from using pillar scores that may not fully encapsulate execution quality or sector materiality. Although accounting measures are standardized and comparable, they do not directly capture valuation channels. Third, while random

effects models mitigate some unobserved heterogeneity, the design cannot entirely eliminate endogeneity concerns, such as reverse causality or omitted time-varying shocks. Finally, by focusing on four sectors, the study enhances internal coherence but may limit external validity to the broader market and jurisdictions beyond Hong Kong.

Future research can address these limitations in several ways. Extending the observational horizon to five to ten years would allow for the analysis of longer-term valuation and financing channels, including Tobin's Q, cost of equity and debt, and risk measures. Employing stronger identification strategies—such as difference-in-differences designs that exploit regulatory changes—could help mitigate risk. In terms of measurement, triangulating ESG data across multiple providers and developing materiality-weighted, outcome-based indices—augmented by assurance status and granular, auditable KPIs (e.g., emissions, energy intensity, incident rates, whistleblower activity)—could enhance construct validity. Finally, conducting sector-specific deep dives complemented by qualitative methods, such as interviews and case studies, would illuminate implementation quality and organizational contexts that are often difficult to observe in quantitative panels alone.

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Appendices

Appendix 1

Regression Table

Model 1: ROA – ESGD and ESGP

Sample: 2017 2019

Cross-sections included: 178

Total panel (balanced) observations: 534

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.139871	1.518793	3.384182	0.0008
ESGD	-0.039686	0.027667	-1.434398	0.1520
ESGP	-0.177344	0.104086	-1.703826	0.0890
SIZE	0.725042	0.186503	3.887552	0.0001
IOB_R	0.088865	0.192314	0.462085	0.6442
Effects Specification				
			S.D.	Rho
Cross-section random			4.147622	0.7552
Idiosyncratic random			2.361556	0.2448
Weighted Statistics				
R-squared	0.034579	Mean dependent var		1.510699
Adjusted R-squared	0.027279	S.D. dependent var		2.391851
S.E. of regression	2.359001	Sum squared resid		2943.825
F-statistic	4.736926	Durbin-Watson stat		1.628880
Prob(F-statistic)	0.000920			
Unweighted Statistics				
R-squared	0.059256	Mean dependent var		4.837509
Sum squared resid	11946.69	Durbin-Watson stat		0.401378

Appendix 2

Regression Table

Model 2: ROE – ESGD and ESGP

Sample: 2017 2019

Cross-sections included: 178

Total panel (balanced) observations: 534

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.28489	4.174119	3.901395	0.0001
ESGP	-0.307458	0.332560	-0.924518	0.3556
ESGD	-0.041973	0.079379	-0.528761	0.5972
SIZE	0.651069	0.476586	1.366112	0.1725
IOB_R	-0.622996	0.488764	-1.274635	0.2030
Effects Specification				
			S.D.	Rho
Cross-section random			10.13167	0.6279
Idiosyncratic random			7.799609	0.3721
Weighted Statistics				
R-squared	0.008308	Mean dependent var	5.096557	
Adjusted R-squared	0.000810	S.D. dependent var	7.805017	
S.E. of regression	7.801856	Sum squared resid	32199.68	
F-statistic	1.107989	Durbin-Watson stat	1.485641	
Prob(F-statistic)	0.351918			
Unweighted Statistics				
R-squared	0.009877	Mean dependent var	12.54848	
Sum squared resid	86129.85	Durbin-Watson stat	0.555408	

Appendix 3

Regression Table

Model 3: EPS – ESGD and ESGP

Sample: 2017 2019

Cross-sections included: 178

Total panel (balanced) observations: 534

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.099408	0.600042	-0.165669	0.8685
ESGD	0.011309	0.009995	1.131490	0.2584
ESGP	-0.107987	0.033607	-3.213227	0.0014
SIZE	0.396864	0.082615	4.803793	0.0000
IOB_R	0.042841	0.086135	0.497371	0.6191
Effects Specification				
			S.D.	Rho
Cross-section random			1.909765	0.8686
Idiosyncratic random			0.742772	0.1314
Weighted Statistics				
R-squared	0.063758	Mean dependent var		0.278239
Adjusted R-squared	0.056679	S.D. dependent var		0.764599
S.E. of regression	0.742615	Sum squared resid		291.7314
F-statistic	9.006267	Durbin-Watson stat		1.500051
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.120565	Mean dependent var		1.269944
Sum squared resid	2208.869	Durbin-Watson stat		0.198116

Appendix 4

Regression Table

Model 4: ROA – EP, SP and GP

Sample: 2017 2019

Cross-sections included: 178

Total panel (balanced) observations: 534

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.163974	1.215298	2.603455	0.0095
EP	-0.145941	0.086219	-1.692680	0.0911
SP	0.008582	0.118118	0.072657	0.9421
GP	0.065389	0.127208	0.514029	0.6074
SIZE	0.672463	0.184183	3.651054	0.0003
IOB_R	0.059968	0.191978	0.312371	0.7549
Effects Specification				
			S.D.	Rho
Cross-section random			4.145045	0.7533
Idiosyncratic random			2.372038	0.2467
Weighted Statistics				
R-squared	0.031880	Mean dependent var		1.517597
Adjusted R-squared	0.022712	S.D. dependent var		2.395592
S.E. of regression	2.368231	Sum squared resid		2961.297
F-statistic	3.477383	Durbin-Watson stat		1.637052
Prob(F-statistic)	0.004215			
Unweighted Statistics				
R-squared	0.061109	Mean dependent var		4.837509
Sum squared resid	11923.16	Durbin-Watson stat		0.406587

Appendix 5

Regression Table

Model 5: ROE – EP, SP and GP

Sample: 2017 2019

Cross-sections included: 178

Total panel (balanced) observations: 534

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.54761	3.326058	3.772516	0.0002
EP	-0.248416	0.273343	-0.908806	0.3639
SP	0.185986	0.371824	0.500200	0.6171
GP	0.364140	0.399228	0.912110	0.3621
SIZE	0.574050	0.460947	1.245371	0.2135
IOB_R	-0.676146	0.478679	-1.412525	0.1584

Effects Specification

	S.D.	Rho
Cross-section random	9.895081	0.6152
Idiosyncratic random	7.825143	0.3848

Weighted Statistics

R-squared	0.010573	Mean dependent var	5.211794
Adjusted R-squared	0.001203	S.D. dependent var	7.863993
S.E. of regression	7.859261	Sum squared resid	32613.50
F-statistic	1.128409	Durbin-Watson stat	1.472971
Prob(F-statistic)	0.344111		

Unweighted Statistics

R-squared	0.017852	Mean dependent var	12.54848
Sum squared resid	85436.08	Durbin-Watson stat	0.562277

Appendix 6

Regression Table

Model 6: EPS – EP, SP and GP

Sample: 2017 2019

Cross-sections included: 178

Total panel (balanced) observations: 534

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.100026	0.493636	0.202630	0.8395
EP	-0.023981	0.028158	-0.851674	0.3948
SP	0.039676	0.038768	1.023439	0.3066
GP	-0.018716	0.041831	-0.447418	0.6548
SIZE	0.400337	0.082343	4.861812	0.0000
IOB_R	0.049838	0.086562	0.575743	0.5650

Effects Specification

	S.D.	Rho
Cross-section random	1.921162	0.8679
Idiosyncratic random	0.749552	0.1321

Weighted Statistics

R-squared	0.049061	Mean dependent var	0.279070
Adjusted R-squared	0.040056	S.D. dependent var	0.765414
S.E. of regression	0.749928	Sum squared resid	296.9428
F-statistic	5.448110	Durbin-Watson stat	1.491414
Prob(F-statistic)	0.000067		

Unweighted Statistics

R-squared	0.107150	Mean dependent var	1.269944
Sum squared resid	2242.566	Durbin-Watson stat	0.197481

Appendix 7

Bloomberg ESG Disclosure Score

Pool of ESG Issues – Environmental

Topic	Field Description	Units
Air Quality	● Nitrogen Oxide Emissions ● VOC Emissions ● Carbon Monoxide Emissions ● Particulate Emissions ● Sulphur Dioxide / Sulphur Oxide Emissions	Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes
Climate Change	● Emissions Reduction Initiatives ● Climate Change Policy ● Climate Change Opportunities Discussed ● Risks of Climate Change Discussed ● Direct CO2 Emissions ● Indirect CO2 Emissions ● ODS Emissions ● GHG Scope 1 ● GHG Scope 2 ● GHG Scope 3 ● Scope 2 Market Based GHG Emissions ● Scope of Disclosure ● Carbon per Unit of Production	Y/N Y/N Y/N Y/N Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes CO2e Thousand Metric Tonnes CO2e Thousand Metric Tonnes CO2e Thousand Metric Tonnes CO2e Thousand Metric Tonnes CO2e Nominal (1-3) Metric Tonnes/Unit of Production
Ecological & Biodiversity Impacts	● Biodiversity Policy ● Number of Environmental Fines ● Environmental Fines (Amount) ● Number of Significant Environmental Fines ● Amount of Significant Environmental Fines	Y/N Count Million Reporting Currency Count Million Reporting Currency

Bloomberg ESG Disclosure Score
Pool of ESG Issues – Environmental

Topic	Field Description	Units
Energy	● Energy Efficiency Policy ● Total Energy Consumption ● Renewable Energy Use ● Electricity Used ● Fuel Used - Coal/Lignite ● Fuel Used - Natural Gas ● Fuel Used - Crude Oil/Diesel ● Self-Generated Renewable Electricity ● Energy Per Unit of Production	Y/N Thousand Megawatt Hours Thousand Megawatt Hours Thousand Megawatt Hours Thousand Metric Tonnes Thousand Cubic Meters Thousand Cubic Meters Thousand Megawatt Hours Megawatt Hours/Unit of Production
Materials & Waste	● Waste Reduction Policy ● Hazardous Waste ● Total Waste ● Waste Recycled ● Raw Materials Used ● % Recycled Materials ● Waste Sent to Landfills ● Percentage Raw Material from Sustainable Sources	Y/N Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes Thousand Metric Tonnes Percentage Thousand Metric Tonnes Percentage
Supply Chain	● Environmental Supply Chain Management	Y/N
Water	● Water Policy ● Total Water Discharged ● Water per Unit of Production ● Total Water Withdrawal ● Water Consumption	Y/N Thousand Cubic Meters Liters/Unit of Production Thousand Cubic Meters Thousand Cubic Meters

Bloomberg ESG Disclosure Score

Pool of ESG Issues – Social

Topic	Field Description	Units
Community & Customers	● Human Rights Policy ● Policy Against Child Labour ● Quality Assurance and Recall Policy ● Consumer Data Protection Policy ● Community Spending ● Number of Customer Complaints ● Total Corporate Foundation and Other Giving	Y/N Y/N Y/N Y/N Million Reporting Currency Count Million Reporting Currency
Diversity	● Equal Opportunity Policy ● Gender Pay Gap Breakout ● % Women in Management ● % Women in Workforce ● % Minorities in Management ● % Minorities in Workforce ● % Disabled in Workforce ● Percentage Gender Pay Gap for Senior Management ● Percentage Gender Pay Gap Mid & Other Management ● Percentage Gender Pay Gap Employees Ex Management ● % Gender Pay Gap Top Empl Including Management ● % Women in Middle and or Other Management	Y/N Y/N Percentage Percentage Percentage Percentage Percentage Percentage Percentage Percentage Percentage Percentage
Ethics & Compliance	● Business Ethics Policy ● Anti-Bribery Ethics Policy ● Political Donations	Y/N Y/N Million Reporting Currency

Bloomberg ESG Disclosure Score

Pool of ESG Issues – Social

Topic	Field Description	Units
Health & Safety	● Health and Safety Policy ● Fatalities - Contractors ● Fatalities - Employees ● Fatalities - Total ● Lost Time Incident Rate ● Total Recordable Incident Rate ● Lost Time Incident Rate - Contractors ● Total Recordable Incident Rate - Contractors ● Total Recordable Incident Rate - Workforce ● Lost Time Incident Rate - Workforce	Y/N Count Count Count Lost Time Incidents/200,000 Hours Worked or 100 Full Time Employees Recordable Incidents/200,000 Hours Worked or 100 Full Time Employees Lost Time Incidents Contractors/200,000 Hours Worked or 100 Contractors Recordable Incidents Contractors/200,000 Hours Worked or 100 Contractors Recordable Incidents/200,000 Hours Worked or 100 Employees & Contractors Lost Time Incidents/200,000 Hours Worked or Employees & Contractors
Human Capital	● Training Policy ● Fair Remuneration Policy ● Number of Employees - CSR ● Employee Turnover % ● % Employees Unionized ● Employee Training Cost ● Total Hours Spent by Firm - Employee Training ● Number of Contractors	Y/N Y/N Count Percentage Percentage Million Reporting Currency Hours Count
Supply Chain	● Social Supply Chain Management ● Number of Suppliers Audited ● Number of Supplier Audits Conducted ● Number Supplier Facilities Audited ● Percentage of Suppliers in Non-Compliance ● Percentage Suppliers Audited	Y/N Count Count Count Percentage Percentage

Bloomberg ESG Disclosure Score

Pool of ESG Issues – Governance

Topic	Field Description	Units
Audit Risk & Oversight	● Audit Committee Meetings ● Years Auditor Employed ● Size of Audit Committee ● Number of Independent Directors on Audit Committee ● Audit Committee Meeting Attendance Percentage	Count Years Count Count Percentage
Board Composition	● Company Conducts Board Evaluations ● Size of the Board ● Number of Board Meetings for the Year ● Board Meeting Attendance % ● Number of Executives / Company Managers ● Number of Non-Executive Directors on Board	Y/N Count Count Percentage Count Count
Compensation	● Company Has Executive Share Ownership Guidelines ● Director Share Ownership Guidelines ● Size of Compensation Committee ● Num of Independent Directors on Compensation ● Number of Compensation Committee Meetings ● Compensation Committee Meeting Attendance %	Y/N Y/N Count Count Count Percentage
Diversity	● Board Age Limit ● Number of Female Executives ● Number of Women on Board ● Age of the Youngest Director ● Age of the Oldest Director	Years Count Count Years Years

Bloomberg's Environmental and Social Scores provide a data-driven measure of corporate environmental and social performance that investors can use to quickly evaluate performance across a range of key issues. Bloomberg's industry-specific materiality frameworks are the result of Bloomberg Intelligence research and Terminal data collected from company sources. Environmental and Social scoring peer groups are based on the Bloomberg ESG Classification System (BECS) reflective of its materiality frameworks. Resulting Field Scores will range from 0 to 10 and 10 is better.

Disclosure factor will be applied to populated ES scores if any component fields are missing for ES indicators.

ENVIRONMENTAL

Air Quality

Air Emissions

Air Emissions Policies

Climate Exposure

Transition Risk

Ecological Impact

Ecosystem Protection

Environmental Fines

Environmental Incidents

Energy Management

Energy Consumption

Renewable Energy Use

Environmental Supply Chain Management

Sustainable Sourcing

GHG Emissions Management

GHG Emissions

GHG Emissions Policies

GHG Regulation

GHG Target

Sustainable Product

Green Product

Waste Management

Hazardous Waste Generation

Hazardous Waste Recycling

Waste Generation

Waste Recycling

Water Management

Wastewater

Water Use

Water Use Policies

SOCIAL

Community Rights & Relations

Community & Human Rights

Community Relations

Ethics & Compliance

Business Ethics

Competitive Behavior

Legal & Regulatory Management

Labor & Employment Practices

Labor Actions

Organized Labor

Training

Occupational Health & Safety Management

Fatalities

Health & Safety Fines

Health & Safety Policies

Safety Incidents

Operational Risk Management

Operational Incidents

Operational Preparedness

Product Quality Management

Product Quality & Safety

Social Supply Chain Management

Supplier Social Compliance

Bloomberg has developed Governance scores for more than 4,300 global companies across all sectors and regions. Combining data from the Bloomberg Terminal with insights from Bloomberg Intelligence (BI) and Bloomberg Law, Bloomberg Governance scores offer quantitative, transparent analyses. Under the Governance pillar, currently the themes of Board Composition, Executive Compensation, and Shareholder Rights touch on a number of core ESG Issues that can have material impact on company performance, as research shows.

Possible reasons why G score is missing: Currently G score doesn't apply disclosure factor, meaning G pillar is not populated if any component fields are missing. Meanwhile ES score has disclosure factor applied, therefore the pillar scores are populated.

BOARD COMPOSITION

Director Roles

CEO Roles

Chair Roles

Board Roles

Diversity

Age Diversity

Gender Diversity

Independence

Board Leadership Independence

Board Independence

Refreshment

Board Refreshment

Chair Refreshment

EXECUTIVE COMPENSATION

Incentive Structure

CEO Incentive Plan Design

Executive Incentive Plan Design

Executive Pay Equity

Executive Pay Linkages

Pay Governance

Compensation Board Oversight

Gender Diversity

Say on Pay

Pay Policies

Pay for Performance

Fixed Pay Alignment

Variable Pay Performance

SHAREHOLDER RIGHTS

Shareholder Policies

Takeover Defense

Voting Rights

Director Election Policies

Director Voting

Director Terms

Director Support

Audit theme is to be composed of 3 issues:

- Audit outcome
- Audit committee
- External Auditor.

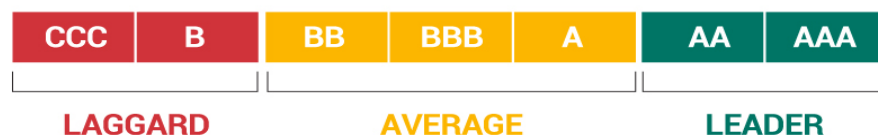
Details of how Bloomberg is looking at sub-topics under each issue have not been officially came out.

Morgan Stanley Capital International (MSCI) is an American provider of comprehensive financial information including equity, fixed assets,

hedge funds and stock market indexes. It has 40 years of ESG rating experience.

The MSCI ESG ratings are designed to help investors identify ESG risks and opportunities across their portfolios and assess exposure and risk management relative to peers through standardized methods. The MSCI ESG ratings do not represent companies' absolute performance but aim to provide results comparable to industry standards and peer performance.

Sustainability Index	Assessment Method
	Evaluates a company's sustainability performance based on environmental, social and governance criteria. It relies on publicity materials including sustainability reports. The score is also based on the ESG risks and opportunities of the company's core business and industry issues.



MSCI ESG Rating

Pool of ESG Issues

Environmental	Social	Governance
● Carbon Emissions ● Product Carbon Footprint ● Climate Change Vulnerability ● Financing Environmental Impact ● Water Stress ● Biodiversity & Land Use ● Raw Material Sourcing ● Toxic Emissions & Waste ● Packaging Material & Waste ● Electronic Waste ● Opportunities in Clean Tech ● Opportunities in Green Building ● Opportunities in Renewable Energy	● Labour Management ● Health & Safety ● Human Capital Development ● Supply Chain Labour Standards ● Product Safety & Quality ● Chemical Safety ● Consumer Financial Protection ● Privacy & Data Security ● Insuring Health & Demographic Risk ● Responsible Investment ● Community Relations ● Controversial Sourcing ● Access to Communications ● Access to Finance ● Access to Health Care ● Opportunities in Nutrition & Health	● Governance ● Ownership & Control ● Board ● Pay ● Accounting ● Business Ethics ● Tax Transparency