

Sustainability Performance, Credit Ratings and Share Price: A Global Study

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Abstract

This thesis first investigated the impact of the ESG overall score, in addition to the standalone ESG pillars, i.e., environmental, social, and governmental scores, on the corporate credit ratings. Second, this study investigated the impact of corporate credit ratings on share price. Finally, this study further examined the moderating role of ESG and its pillars in strengthening the relationship between credit ratings and share price. This research required a sample of 400 non-financial firms extracted from the global market, considering the four continents, namely, Asia, Europe, the Americas, and Oceania, during the period 2008-2022. This research used ordinal-logistic regression to study the impact of ESG score on credit ratings. In addition, it used the panel regression analysis to study the influence of credit ratings on share price as well as the moderating role of ESG in strengthening this relationship. Several firm-specific and country-specific control variables were included, such as the cash conversion cycle, EBIT margin, leverage, firm size, GDP growth, and inflation rates.

The empirical findings confirm our hypotheses, demonstrating a significant positive relationship between the ESG overall score, each of the standalone scores, and the corporate credit ratings, as well as the moderating role of ESG in strengthening the positive relationship between credit ratings and share price. This suggests that a higher ESG score would result in better credit ratings and higher share price. Similarly, the results also reveal that larger firms, higher profitability, and economic growth improve the firm's creditworthiness. Whereas higher credit ratings, larger firms, higher profitability, and lower leverage increase the firm's share price. Further tests using three sub-sample periods were conducted to check the robustness of these findings and obtain similar results, thus confirming our initial findings on ESG and credit ratings. The novelty of this research is based on its stratified sampling technique, geographical location, period of study, methodology and unique set of variables, which provides a nuanced understanding of the relationship between ESG, credit ratings and share price. To the best of knowledge, this is the first study to examine the moderating role of ESG between credit ratings and share price, using panel regression analysis.

This study is of great interest to the corporate firms to understand the importance of ESG performance globally, to investors in their decision-making process, and to policymakers as part of their efforts to exercise institutional pressure on companies to adopt and enhance their ESG performance to benefit the larger society.

DEDICATION

This thesis is dedicated to firstly, the Almighty God for His Mercy and blessings to carry out this study.

To my beloved parents and husband, who continually motivated and stood by me, to achieve my goals.

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Chapter One

Introduction and Overview of the Thesis

1.0 Introduction

In recent years, there has been a significant shift in the measure of creditworthiness of firms to a combination of financial and non-financial factors (Chodnicka-Jaworska, 2021). This shift has brought awareness to the firms' requirements to report and address sustainability concerns, which has become pivotal to their success. Firms can no longer disregard the sustainability wave or work solo to meet the wider stakeholder expectations, as they now need to combine their strategic networks to resolve challenging sustainability issues (Lokuwaduge and Silva, 2022). Hence, what was once introduced as a concept of sustainable development in the 1980s has quickly transitioned into a global notion, which is actively supported by several international organizations and members of the society (Qiu, 2023).

The Environmental, Social, and Governance (ESG) practices were initially proposed and discussed in the UN Global Compact in 2004 (Hu et al., 2023). The Principles for Responsible Investment (PRI) in partnership with the UN Global Compact and United Nations Environmental Program (UNEP) Finance Initiative, began the "ESG in Credit Ratings" initiative that has brought forth a huge transition in sustainable practices (Henisz et al., 2019). This is currently supported by over 180 investors, with more than \$40 trillion in assets under management (AUM), and 28 credit rating agencies including S&P, Fitch, and Moody's (PRI, 2022). Since then, ESG factors have become increasingly important in the financial community worldwide, as responsible business models are fundamental in the transition to a sustainable global economy (Fabozzi et al., 2021; Jang et al., 2020). Hence, the firm's ESG performances are increasingly being considered by investors as a guiding principle for investment decision-making, and consequently, impacting its share prices (C. Li et al., 2022).

Credit ratings have become a vital instrument in the hands of the firms' stakeholders and investors because they enable them to have access to superior information at a low cost, act as a screening mechanism to minimize asymmetric information, and provide a source to make efficient risk-return trade-offs (Gupta, 2021). As the demand for ESG disclosures and corporate transparency arose, the credit ratings provided by Credit Rating Agencies (CRAs) began playing a major role in analyzing

the firm's creditworthiness. They provide corporate credit ratings which reduce investor information ambiguity, provide insight into credit risk, and encourage investment in highly rated firms and their instruments (Gupta and Sharma, 2017). CRAs assess both the financial and non-financial components while awarding a rating score to the firm (Gupta and Sharma, 2017). Understanding the ESG factors that can impact credit ratings is critical, as a poor rating by CRAs would make investors and stakeholders perceive the firm as vulnerable to possible losses (Leite and Uysal, 2023).

1.2 Background

Firstly, credit rating is one of the essential factors that investors rely on when making investment decisions and is also analyzed by financial institutions to predict the organization's credit and default risks (Chodnicka-Jaworska, 2021). In recent years, there has been a rise in the significance of ESG measures as a reflection of firms' performance and it has been evident with the advancement of Socially Responsible Investment (SRI). In 2015, a global level commitment was undertaken to transition to a greater sustainable economy under the 17 Sustainable Development Goals (SDGs) implemented by the United Nations and the Paris Climate Change Agreement. This change has brought a unified effort from asset management, financial organizations, and credit rating agencies (CRAs) to integrate ESG metrics into their evaluation processes.

Secondly, share price information is commonly referred to as the private information contained within the share price, which could be of new information to the managers. It could also act as a reference for decision-making in enterprise production management and investment management. Hence, stock price is considered to be the ideal index to reflect the dynamic variations in the price information (Bai, 2022). The systematic and the firm-specific risk factors influence the stock price informativeness (SPI) in the market. Investors tend to trade shares in response to the firm's information regarding their growth probability, financial performance and non-financial ESG sustainability performance (Ng and Rezaee, 2020). The ESG performance of the organization provides more enterprise-specific details, which could reduce the degree of information asymmetry, alleviate uncertain expectations of investors, decrease irrational behaviors, and enhance the stock price synchronicity (Hu et al., 2023).

It is essential to understand the difference between the systematic risk and idiosyncratic risk of equities, whereby the former relates to the macroeconomic factors which impact the entire market

and all the organizations within. These risks could include commodity price shocks, regulatory changes, inflation rates, technological advancements, and interest rates. Whereas the latter, idiosyncratic risk, relates to the firm-specific risks confined to a particular firm, and which can be mitigated by investors through a diversified strategy (Giese et al., 2019). This distinction is imminent to evaluate the influence of ESG factors on firm valuation as investors tend to diversify from unsystematic risks. The firm's idiosyncratic risk is seen to be significantly reduced when listed firms invest in ESG factors, as it provides access to more transparent information in the market and thereby decreases the stocks idiosyncratic volatility (Liu et al., 2023). In addition, the CRAs provide new data to the market through rating announcements, i.e., upgrades, downgrades, reviews, and outlook reports, which cause a significant influence on risks. Hence, a positive announcement, which implies an improvement in the firm's credit quality, results in lowering idiosyncratic risks. This information is important to the investors for assessing the valuation and risk of the firm (Abad and Robles, 2014).

According to Bloomberg (2022), ESG assets under management will reach \$50 trillion by 2025, thus becoming more than a third of the forecasted \$140.5 trillion in total global assets. The commitment to ESG provides a risk mitigation method as these factors impact a debtor's cash flows and firms' default probability valuation (Devalle et al., 2017). Therefore, a positive influence of ESG performance would foster higher credit ratings, and a study on the strength of their relationship would aid in determining the interest on bonds, cost of capital, as well as the decisions adopted by investors, bank, insurers, or others (Chodnicka-Jaworska, 2022).

Furthermore, investor preferences on organizations with different ESG performances cause varying trading demands which impacts the stock prices (H. Wang et al., 2023). According to Gao et al. (2022), the performance of ESG is observed to influence a reduction in the stock price crash risk by enhancing the analysts' information transparency, promoting the interest of high-quality green investors, and strengthening corporate governance in terms of investment efficiency and agency costs. In addition, the CRAs are considered to contribute to stabilizing the equity market by releasing information about the firm's credit risk in the form of credit ratings (Nguyen et al., 2023). Hence, an in-depth study on the impact of credit ratings on share price with ESG performance as a moderator would foster a greater understanding of the prevalence of ESG preferences among the investors.

1.3 Problem of the Study

The growing stakeholder interest towards ESG awareness created an imminent momentum within firms to integrate sustainability practices into the critical aspects of their company's operations. These ESG commitments have emerged as accountability measures which highlights the firm's voluntary engagements towards its non-financial goals and objectives (Arayssi et al., 2020). Despite this burgeoning demand, there is still a dearth of empirical evidence on the extent of influence ESG practices have on the critical financial metrics of the firm that signifies its creditworthiness and value (Devalle et al., 2017; Khamisu et al., 2024; Michalski and Low, 2021). This paucity of information creates a knowledge gap among the firms, investors, and other stakeholders in completely understanding the implications of ESG practices. Consequently, this thesis aims to solve the problem by understanding the nuanced causal mechanisms that build the positive association between ESG performance and corporate credit ratings, as well as the moderating role of ESG between the credit ratings and share price.

Firstly, the association between ESG practices and credit ratings is multifaceted. Credit ratings are increasingly used by investors when making their investment decisions as these are considered to reflect both the firm's public and private information which is gathered by CRAs through due diligence (Li et al., 2020). Hence, a critical concern is whether the firm's ESG practices really impact the ratings awarded by the agencies so that stakeholders and investors can make informed decisions.

Secondly, the managers, on average, have the motive to disclose positive news to the equity market and withhold the bad news in their public disclosures in order to maximize their share price. However, these managers could be induced to reveal the negative news in their private disclosure to the rating agencies due to the substantial rating power of the CRAs (Ahn et al., 2019). Despite the existing studies testing the relationship between credit ratings and share price, it was nonetheless examined with a narrow perspective. Most researchers studied the impact of rating upgrades and downgrades on stock market reactions using the event study methodology (Dawar et al., 2021; Reddy et. al, 2019). Hence, the lack of strong statistical evidence that investigates the response of the market to credit ratings is evident.

Thirdly, there is a large divergence in the existing literature with mixed views emerging on the ability of ESG practices to impact share prices positively and strengthen stock price resiliency

during periods of crisis (Jin and Lei, 2023; Xu et al., 2023). This concern is further exacerbated by the possible agency problem and the stakeholder maximization theories. The agency problem is wherein the managers focus on investments that could be at the expense of the shareholders. Whereas, the stakeholder maximization theory advocates for the practices that reduce information asymmetries and conflict of interests (Nguyen et al., 2022).

Hence, this study aims to provide an understanding of the interrelationships pattern existing between the firm's ESG performance, share prices and credit ratings. These are crucial for the firm and its stakeholders to effectively measure the impact of firm's ESG performance. In addition, this thesis further extends to also consider the possibility of whether ESG can act as a moderator to strengthen the relationship between credit ratings and share price.

1.4 Research Questions

The existing studies have predominantly emphasized the direct influence of ESG performances on the financial implications of the firm. However, they have most often overlooked the nuanced mechanism that drives the impact of ESG on the firms' creditworthiness and market valuation. This thesis seeks to investigate the relationship pertaining to the overall performance of ESG and its standalone pillars towards the key firm metrics by addressing the pivotal research questions:

- Do the firm's Environmental, Social and Governance practices have an impact on the corporate credit ratings awarded by CRAs?
- Does ESG performance moderate the relationship between corporate credit ratings and share price?

1.5 Research Objectives

The main objective of this research is to examine the relationship between ESG and credit ratings as well as the moderating role of ESG in the relationship between credit ratings and share price. This would then provide emphasis on the importance of organizations becoming ESG-conscious and integrating ESG factors into their operational activities (Bhattacharya and Sharma, 2019). This study would also identify the ESG pillars that are most relevant to influencing the credit ratings of the firm, hence shedding light on the importance of ESG investment and disclosure. The findings of this thesis would contribute to the literature on ESG, credit ratings and share prices globally and provide valuable data to organizations to make informed decisions. It could also be of interest to

the Securities and Exchange Commission (SEC) as part of their initiatives in firm's reporting ESG sustainability information and non-GAAP financial measures (Ng and Rezaee, 2020).

Prior studies have primarily focused on the association between ESG and firm performance with minimal theoretical attention towards the impact on credit ratings (Rahman and Alsayegh, 2021). Existing literature is mostly centered around the impact on share prices from the perspective of executive motivation, firm's data quality, information transparency and other characteristics, with little focus towards the ESG performance (Xu et al., 2022). This research is anticipated to close the gap by studying the impact of ESG on credit ratings as well as its moderating role on the relationship between credit ratings and share price. Additionally, there is limited research that investigates the association between individual components of sustainability i.e., mostly CSR, and the information environment in controlled empirical settings (Ng and Rezaee, 2020). This thesis intends to first study the impact of each of the individual ESG dimensions, i.e., environmental, social, and governance scores on credit ratings. Second, this study would investigate the moderating role of ESG in strengthening the relationship between credit ratings and share price.

1.6 Contribution of the Thesis

This study demonstrates its novelty in several dimensions. Firstly, there is a dearth in the scope of previous studies with respect to the geographical location and time span of study. For example, Devalle et al. (2017) studied the impact of ESG on credit ratings by specifically taking into consideration the Italian and Spanish public companies over a range of only one fiscal year. Similarly, Chodnicka-Jaworska (2021) has studied the European public companies with a limited number of observations and lower variations in credit ratings. This reduces the generalizability of the findings. As ESG performance is arising as an important measure of organizational success worldwide, it is pertinent to analyze their impact across different countries (Krishnamoorthy, 2021). Additionally, this thesis offers a unique contribution by investigating the impact of overall credit ratings on share price globally, using a panel regression methodology. The existing literature is mostly focused on studying the impact of credit rating upgrade and downgrade announcements on share prices, using event study methodologies (Amin et al. 2018; Mokoaleli-Mokoteli, 2019). Therefore, this thesis encompasses a sample of 400 non-financial firms from Asia, Europe, America, and Oceania for a time period ranging from 2008 to 2022. Secondly, this study has utilized several firm-specific and country-specific control variables that act as appropriate predictors for

corporate credit ratings and share price. This is among the very few studies that examine the impact of ESG pillars on corporate credit ratings, as well as the moderating role of ESG between credit ratings and share price, using a combination set of controlled variables which include the firm size, EBIT margin, cash conversion cycle, leverage, GDP, and inflation.

The significant distinction in this thesis is that, to our best knowledge, this is the first study to test the moderating role of ESG and its three pillars between the corporate credit ratings and its share price using the panel regression analysis. The other slightly comparable previous study uses only an event-study methodology to assume that ESG plays a role on moderating the credit ratings only during rating upgrades and that the individual components of ESG do not have any significance with the ratings (Leite and Uysal, 2023). This thesis study provides empirical evidence to resolve the contradictions in the existing literature influenced by opposing evidence and competing arguments in the association between ESG practices, credit ratings and share price. This study expects to close the gap by providing a vital contribution through multi-country studies wherein the same methodology can be applied across many countries making the data obtained more reliable and efficient, as compared to a single-country study (Gerged et al., 2020).

This thesis will contribute significantly to the literature on ESG, credit ratings and share price by providing insights to stakeholders, organizational leaders, and investors. The management must be aware of the significance of ESG disclosure as a predictor of credit rating and meet the requirements of the stakeholders as in the legitimacy theory (Bhattacharya and Sharma, 2019). Whereas investors use this information to analyze the transparency and credibility of the firms. These findings may also influence CRAs and policymakers to exercise institutional pressure on companies to adopt ESG practices (Jang et al., 2020).

1.7 Thesis Structure

This thesis is comprised of 5 chapters which has been designed to comprehensively study the impact of ESG on credit ratings as well as its moderating role in the relationship between credit ratings and share price.

Chapter One consists of the Introduction which commenced with the background on the fundamental pillars of this thesis, i.e., ESG performance, credit ratings and share price. This section briefly explained the motivation behind this research, the problem statement, the research questions,

objectives, and the contribution towards the literature by bridging the existing gap identified in this thesis.

Chapter Two involves the Literature Review which begins with a historical overview on the credit ratings and ESG, followed by an examination of the theoretical backgrounds underlying this study. In addition, a synthesis of the relevant existing empirical studies is provided to understand the critical association between ESG performance, corporate credit ratings and share price. The gap existing in the literature is hence identified which emphasizes the relevance of this thesis study.

Chapter Three comprises of the Methodology and Model Development which illustrates the Saunders research onion model and the technique of carefully selecting a reliable and valid sample. Furthermore, the dependent, independent and control variables are hypothesized to develop the model specification that builds the foundation for this thesis.

Chapter Four is the Results, Analysis and Discussion of the findings from the different econometric models used in this thesis, including the descriptive, correlation, ordinal logistic and panel regression analysis. In addition, the results are discussed using evidence from previous studies and theoretical backgrounds.

Chapter Five consists of the Conclusion which reinforces the importance of this research, summarizes the notable findings, considers the limitations, provides recommendations for future research, and finally highlights the practical and social implications of this study.

Chapter Two

Literature Review

2.0 Introduction

This chapter commences with a historical overview of the significant components in this research, which then advances towards the literature review through a series of five subsections. Section 2.1 investigates the historical background and purpose of credit ratings. Section 2.2 analyzes the historical overview and evolution of ESG. Section 2.3 examines the theoretical background related to this thesis. Section 2.4 provides a literature review on the previous studies related to ESG, credit ratings and share price. Finally, section 2.5 provides a brief summary of the gaps identified in the existing literature. This critical examination intends to understand the main concerns and trends within the current body of knowledge and hence, identify the areas of gap which contextualizes the motivation behind this thesis.

2.1 Credit Ratings: A Historical Overview

Credit rating is widely acknowledged to be one of the most significant approaches for assessing a firm's creditworthiness. Literature in the domain of credit rating discusses its three foundations namely, credit rates and factors, credit rating models, and credit rating agencies (Ubarhande and Chandani, 2021). Credit ratings are considered as a link between debtors and issuers to mitigate the information asymmetry in the financial market by providing an independent observation of a firm's creditworthiness (Hertikasari and Artha, 2022). Credit ratings indicate the firm's creditworthiness, default of payment probability, and forecast the degree of firm's risk. The Credit Rating Agencies (CRAs) are independent third parties functioning in a market with oligopoly structure as the majority of the credit rating market is dominated by the three prominent agencies, namely the Fitch Ratings, Moody's, and Standard & Poor's (Malewska, 2021). In 1975, these "Big Three" were registered with the SEC and since then have become amongst the CRAs' privileged category of nationally recognized statistical rating organizations (Ng and Ariff, 2019). The CRAs assign credit ratings by disregarding temporary shocks affecting the economy and hence, making it less probable to change in the short time span. Moreover, the CRAs measure the firm's default risk and rate the firms by considering both the financial and non-financial performances (Viswanathan et al., 2021). For instance, S&P rating procedure initiates once the issuer requires a credit rating, whereby, the

rating analysts utilize public disclosure, in-person meetings with executives, and location visits to accumulate both the quantitative financial data as well as the qualitative nonfinancial data. This is then followed by an evaluation of the firm's business and financial risk to assign a credit rating (Hung et al., 2022).

The CRAs have been increasingly scrutinized from the early 2000s since they failed to forecast the collapse of Enron and WorldCom, in addition to their involvement in the financial crisis (Papadimitri et al., 2020). Hence, regulators have since then enhanced the regulations, accuracy, and reliability of CRAs such as the Dodd-Frank Act 2010 in the USA (Krishnan et al., 2020). Furthermore, the increased CRAs' market share and credit ratings trend worldwide has led to the development of stronger rating standards and prompt ratings information (Hung et al., 2022). Credit rating variation has a direct impact on bond and stock prices, which motivates management to make decisions that would enhance the organization's credit ratings. Moreover, investors desire a minimum level of credit ratings prior to making investment decisions, and these ratings are also exercised in financial contracts as a form of covenants. Credit ratings have hence emerged to be significant for investors, debt issuers and regulatory agencies (Krishnan et al., 2020).

2.2 ESG: A Historical Overview

The emergence of Environmental, Social, and Governance (ESG) performance disclosures brings a notable transformation in business procedures, as it arose from being a rarity at the beginning of the 21st century to a predominant factor amongst the largest firms (Rouen et al., 2023). The Environmental (E) component analyzes the procedures practiced by the firms to reduce environmental damage, create energy efficiency, waste, and water resource management. Whereas, the Social (S) component assesses the organization's treatment of their employees, social community, labor standards and human rights. Finally, the Governance (G) component evaluates the management decisions and authority on operating the organization, the independence of the board of administration and anti-competitive practices (Lee and Suh, 2022).

Investors perceive ESG data as a benchmark which provides more extensive and reliable evidence of the positive impact the firm has in the world (Ahmad et al., 2024). Prior to the 2004 UN Global Compact's introduction of ESG, Bowen (1953) first defined CSR as the duty of employers and enterprises to establish policies, make decisions and pursue actions that meet the needs and values of the society. In the mid-twentieth century, Davis (1960) defined social responsibility as the

organization's commitment and operations which were performed for purposes slightly beyond the organization's direct economic or technical goals. Friedman (1962) argued that businesses' sole social responsibility is to utilize its resources and partake in decisions which result in increased profits. This is valid as long as they are involved in an open and free competition that excludes any fraud or deceit. Further emerged the concept of stakeholder theory proposed by Freeman (1984) whereby a firm's effectiveness must not be solely measured by the shareholder value creation that is advocated by the agency theory, and rather the firm must be held accountable to multiple stakeholders. Hence, the literature on CSR prospered and soon business operations expanded to adopt methods of self-reporting, sustainability performance reports, codes of conduct and the incorporation of voluntary international and NGO standards (Pollman, 2021).

The consciousness of a firm's societal responsibilities often arises when a crisis occurs. For instance, the Great Depression 1929 established the US GAAP which enforced accounting standards, the 2008-2009 financial crisis created an urgency to enhance risk management and financial accessibility, whereas the Covid-19 pandemic created higher expectations from the firms to participate in building a positive influence (Krishnamoorthy, 2021). The year 2019 embarked two significant initiatives, one being the letter by Larry Fink, CEO of BlackRock, which is the world's largest multinational investment organization, whereby he enforced that the firm would solely invest in those with a corporate purpose, continuous long-term value creation, and social influence on the society (Jr. et al., 2020). The second was the decision of the corporate Business Roundtable to adopt the principle of stakeholder value as the main purpose of an organization's existence. This was endorsed by 191 CEOs with the perspective that firms are a part of a broader ecosystem, and the implementation of a stakeholder approach would provide a win-win situation for all those within and beyond the firm's boundaries (Krishnamoorthy, 2021). Moreover, according to the KPMG (2022) report, 96% of the G250 firms, which are the largest firms in terms of revenues in the Fortune 500 rankings, report on their ESG and sustainability performance. Hence, what once took 15 years for ESG investments to reach \$30 trillion in 2018 since the 2004 UN report, showed a drastic leap up to \$100 trillion between the years 2018 to 2020 (Krishnamoorthy, 2021).

2.3 Theoretical Background

The theoretical frameworks discussed in this thesis are the signaling theory, agency theory, legitimacy theory, information asymmetry theory, and the market efficiency theory.

2.3.1 Signaling Theory

Spence (1973) introduced signaling theory and proposed that when an information asymmetry occurs between buyers and sellers during market transactions, buyers reduce uncertainty by depending on these signals. Signaling theory states that reputation is developed over time and is not easily replicable by competing parties and hence, reputation plays a core value in reducing stakeholder uncertainty. The stakeholders perceive the credit rating scores awarded to the firms as an indicator of firm performance in all industries (Salvi et al., 2021). According to Bhattacharya and Sharma (2019), CRAs have become both creators and receivers of signals regarding firm's true attributes. This signal is represented through credit ratings. The CRAs obtain signals through ESG disclosure scores of the firms. Hence, in the relationship between ESG and credit ratings, the firms act as signalers while the CRAs act as receivers (Bhattacharya and Sharma, 2019). In the context of share price and credit ratings, any change in the firm's rating is considered a crucial financial event for the market participants. Investors consider these ratings as informed signals on the financial health of the organization and their ability to meet their obligations (Mokoaleli-Mokoteli, 2019). Studies have demonstrated that ESG serves as a "green light" signal to investors for fund allocation to sustainable firms, as opposed to the conventional method of using "red light" signals which merely indicates the firms which should not be invested in (Rogge and Ohnesorge, 2022). When considering the case of ESG and share price, it has been studied by Perdana et al. (2023), that the higher ESG scores of the organization signals a positive response from the investors and potential investors, whereby causing an increase in the stock price. Furthermore, the ESG disclosure could reduce the knowledge-gap amongst the industry and society by forming a long-term relationship between the shareholders (principal) and the agent (top management), resulting in influencing positive effects on the share price (Khandelwal et al., 2023). The signaling theory suggests that firms establish their legitimacy by releasing data that provides a message to the community on the firm's adherence to environmental responsibility and competence as citizens (K. Wang et al., 2023). This enables the firms to create a competitive advantage through accumulation of unique resources provided by the stakeholders' support. Hence, this theory advocates that the disclosure of ESG performance can result in enhanced firm reputation, thereby increasing consumer confidence and establishing stable relationships with the stakeholders (Ruan and Liu, 2021). In accordance with the signaling theory, ESG ratings are an essential indicator based on which the investors determine their investment decisions and hence reducing conflicts emerging from commissioning agents. Likewise,

organizations with low ESG ratings prioritize releasing public reports to alleviate investors' negative outlook of their former low ESG performance, hence minimizing the likelihood of a stock market crash risk (Wang et al., 2022).

2.3.2 Agency Theory

Agency theory by Jensen and Meckling (1976) states that there exists a conflict of interest between a firm's management and its shareholders. This occurs when individuals or groups possess the ownership of the organization in the form of stocks and these shareholders (principals) assigns managers (agents) with the authority to operate the business on their behalf. Agency problem has emerged since the existence of joint stock businesses and the intention to maximize one's interests, which has been increasingly found in fields of sociology, economics, finance, accounting, political science, marketing, and organizational behavior (Panda and Leepsa, 2017). The separation of control and ownership exposes the firm to systematic risks when unethical managers invest in conditions that are based on their own self-interests and not those of the shareholders (Yildirim and Allen, 2021). The principal is focused on the benefits from long-term horizon prospects which may conflict with the agents' preferences for the short-term opportunities (Pulino et al., 2022). The agency costs arise when managers deviate from the interests of the shareholders and cause them to be misled by portraying the organization's financial situation to be better or worse than the reality, with the intentions to obtain loans and investors (Seker and Sengur, 2021). Hence, a broad range of governance mechanisms are used to address agency costs and conflict. This includes the disclosure of non-financial and financial information, which minimizes the agency cost caused by the division of ownership and control (Pulino et al., 2022). As a result, the greater the transparency of non-financial reports such as the ESG, the more satisfied the shareholders are. The strong governance measures that promote monitoring of management decisions and socially responsible behavior in turn deliver a positive impact on the credit ratings and share price (SabriBoubaker et al., 2020). The agency theory indicates that firms with exceptional ESG practices are more motivated to release their CSR initiatives to the market to gain competitive advantage and communicate their long-term goals. Hence, ESG performance and strategies provide benefits to a firm in terms of creating reputation and brand loyalty, investors understanding of the firm's efficiency, lowering capital cost, and sustaining community acceptance, and thus, generating revenue, sales and returns (C. Li et al., 2022). The views of agency theory posit that managers are also incentivized to eradicate uncertainty

gaps to benefit from reduced agency conflicts, improved share prices and higher returns (Jizi et al., 2016). In this context, managers may invest in socially responsible initiatives to enhance their personal reputation amongst the associated stakeholder communities but at the cost of the shareholders' interests (Kruger, 2015). Nevertheless, the study conducted by Engelhardt et al. (2021) on European firms during Covid-19 identified that organizations with higher CSR performances had enhanced capital market outcomes and higher social circumstances without facing competitive disadvantages or greater agency costs. Furthermore, the agency theory utilizes return on assets and return on equity metrics to justify shareholder wealth maximization as they strategically identify environmentally responsible investments portraying fulfillment of management obligations to the shareholders. Hence, higher ESG ratings are viewed by investors as an indicator of enhanced risk management and higher future share prices (Chininga et al., 2023).

2.3.3 Legitimacy Theory

Legitimacy theory proposes that the existence of the firm is dependent on their compliance with the expectations and rules of their local stakeholder environment in which they function (Bowen, 2019). Dowling and Pfeffer (1975) introduced legitimacy theory as a situation that exists when the firm's value system is aligned with that of the larger social system in which they operate. An occurrence of a legitimacy gap, which arises when the business is incompliant with society's expectations, prompts the management to take remedial actions such as corporate disclosures in order to seem legitimate. Suchman (1995) defines legitimacy as a generalized perspective which considers an organization's actions are suitable within a socially built framework of values, beliefs, norms, and definitions. Legitimacy theory emphasizes that a societal agreement is established between the organization and the society in which the company operates (Shakil, 2020). Organizations defend their legitimacy using voluntary disclosures and influencing stakeholder perceptions by providing sentimental messages that ultimately model stakeholder expectations to maintain the company's legitimacy (Seker and Sengur, 2021). Hence, ESG reporting has become a means of communicating that the firm is fulfilling its obligations to the stakeholders, being socially responsible and is not solely in pursuit of profits (Rahman and Alsayegh, 2021). The failure of a firm to meet its ESG obligations could be considered as their negligence towards the community and the firm could hence be penalized. For instance, the stakeholders could lower the demand for the firm's goods and services, suppliers may discontinue providing production materials, investors could withdraw their

shares and thereby, the organization's stock price would be adversely affected causing its financial risk and volatility to reach high extremity (Shakil, 2020). Therefore, legitimacy theory can also be used to describe the relationship between the firm's ESG and stock price volatility, whereby the firm's legitimate disclosure of their ESG activities can reduce the information asymmetry, attain stakeholder trust, and reduce stock price volatility of the firms (Shakil, 2020). Organizations practice ESG disclosures primarily for the purpose of legitimacy-seeking and less for profit-oriented reasons, affirming the neo-institutional theory with the corporate legitimacy whereby, firms are required to justify their responsible operations (Drempetic et al., 2020). Furthermore, firms with higher credit ratings experience a lower cost of debt, whereby, credit ratings are not only linked to the financial indicators and firm's creditworthiness, but also to the ESG performance disclosures. Hence, in accordance with the legitimacy theory, ESG performance emerges as a strategic opportunity to improve credit ratings and build financial advantages by lowering the cost of debt (Amarna et al., 2024).

2.3.4 Information Asymmetry Theory

The concept of information asymmetry in the market was first proposed by Akerlof (1970) who described how the information possessed by the sellers impact the products bought by the buyers as they do not have access to the same information, leading to a lower quality purchase at a higher price. Similarly, the investors who do not possess the required information are disadvantaged in comparison to the firm's management with sufficient data as it is convenient for them to conceal the negative news, which would then accumulate up to the point of a stock price crash (Wang et al., 2022). The board of directors and the audit committee must effectively monitor the managers and utilize both the financial and non-financial data to reduce the information asymmetry caused by the agency challenges (Seker and Sengur, 2021). Cho et al. (2013) identified that both the positive and negative ESG performances have an impact on lowering information asymmetry in the equity market as investors utilize these to make informed decisions. A positive CSR score is perceived by investors as an indicator of the firm's capability in environmentally provisioning resources and effectively monitoring them. Whereas, a negative CSR score, which may arise from involvement in socially controversial activities, provides investors with an indicator of variations in the corporate's profitability or increased risks due to CSR-related mismanagement (Cho et al., 2013).

Furthermore, ESG disclosures aid to reduce information asymmetry through a signaling impact on the market by providing greater information transparency and reducing corporate financial discrepancies (Yua et al., 2022). Hence, the enlightenment provided by the firm's ESG reports can alleviate information asymmetry, enhance firm reputation, and the investor's tolerance to risk, which thereby decreases the probability of the firm's stock price crash risk (Xu et al., 2022). The credit ratings provided by CRAs lower the information asymmetry and it was observed that changes in the ESG risk resulted in a strong negative influence on the credit ratings of non-financial firms. Hence, the significance of ESG factors incorporated in the credit ratings provides information for investment funds to make decisions regarding lowering or proceeding with security investments in firms that practice negative events in relation to the environment, social and government pillars (Chodnicka-Jaworska, 2021). Furthermore, sustainable, and responsible investors attain ESG scores to minimize information asymmetry by paying rating agencies and using these data alongside the firm's financial criteria to make investments decisions (Drempetic et al., 2020). The degree of information asymmetry in the market is greatly impacted by the transparency and issuer practices in their non-financial information report (Czerwinska and Kazmierkiewicz, 2015). Both the capital market participants, i.e., the issuers and investors are impacted by the information asymmetry, whereby the former faces the risks related to ESG information asymmetry caused by the failure to meet financial targets as a result of disclosing sensitive ESG information. Whereas the latter considers the firm's ESG performance risk with regards to the investment portfolio's effectiveness and their reputational risk. In order to maintain market stability and alleviate price shocks, highly developed markets have regulations established to enhance their transparency which enables investors to adequately analyze the issuer's non-financial information, investment risk and firm valuation (Czerwinska and Kazmierkiewicz, 2015). The investor's trust is strengthened when firms release ESG data which manages information asymmetry and encourages them to trade in the organization's stock as they relatively reflect the fair market value, hence resulting in superior stock prices (Jizi et al., 2016).

2.3.5 Market Efficiency Theory

Fama (1965) first proposed the notion of "efficient market" where the actual value of stock prices and its variations at every given point in time is reflective of all available information. The random walk theory by Fama considers the stock price variations to be random and unrelated to the previous

prices as the most recent information is already absorbed in the market price of publicly listed stocks. Similarly, according to Malkiel (1989), a capital market is considered to be efficient if the security prices completely and correctly reflect all the relevant accessible information. Hence indicating that the release of information set would not provide economic profits to the market participants or cause an impact on the security prices. Market efficiency is one of the primary concepts of the modern financial circuits and only an efficient market would have the selection of firms with high ESG performances already incorporated as a selection factor in the investor's decision-making process (Caplan et al., 2013). It is argued that markets are information-efficient in terms of the stock prices based on the available ESG information as the forecasted earnings of stocks with greater ESG ratings are more accurate whereas, those with lower ratings are more prone to bankruptcy (Cooper and Uzun, 2019; Horn, 2023). Moreover, there are lower idiosyncratic risks associated with stocks of firms having higher ESG ratings (Giese et al., 2019). Malkiel and Fama (1970) proposed the efficient market hypothesis (EMH) which comprises of the weak form, semi-strong form, and the strong form. The weak form of EMH implies that the market stock prices reflect all historically available price information, which would hence not enable investors to gain abnormal profits from investing in these stocks. The semi-strong form indicates that the stock prices reflect all the existing public information which includes the past prices and historical data as well as the currently available data released to the market. Hence, investors would not be able to earn higher returns than the market using technical or fundamental evaluation. Finally, the strong form of EMH implies that stock prices reflect both the privately and publicly available information in the market and hence, investors are unable to gain an advantage in the market through any form of information (Titan, 2015). The EMH takes into account the ESG factors as it motivates the investors to consider more than just the financial indicators, which subsequently raises stock price unpredictability (Alam et al., 2022).

The communication of ESG performance through CSR and annual reports enhances the amount of total data available to the capital markets, hence portraying the organization's transparency and reduction in the biasedness of earning forecasts, thereby resulting in improved market efficiency (Bofinger et al., 2022). However, the study conducted by Danila (2022) on ESG indices in emerging markets identified that there is an absence of random walk pattern as investors utilize the opportunity to gain abnormal returns through identification of undervalued stocks in the emerging markets, which indicates an inefficient market. This occurs due to insufficient disclosure of ESG

information, lack of corporate governance and behavioral prejudices. Hence, it is essential for regulators in the emerging markets to establish ESG norms, operational guidelines, policies and enhance the infrastructure of the institutions in order to sustain the markets' fairness (Danila, 2022). Furthermore, the CRAs are essential for capital market efficiency as they aid investors in assessing the firm's default probability. Based on the EMH, the share prices must have reflected information about the firm's credit rating statements, and investors' reaction towards credit rating downgrades is heightened due to the proactive surveillance practiced by CRAs. The market anticipates the firm's credit rating changes and probability of potential downgrades, and hence incorporates the information into the stock prices which thereby creates a less pronounced market reaction as the prices have been adjusted (Dawar et al., 2021).

2.4 Previous Studies

This section delves into reviewing the existing prior studies that have laid the foundation of the literature related to the current study. In particular, section 2.4.1 examines the empirical evidence related to the impact of ESG and its components, i.e., the environmental, social, and governance pillars, on corporate credit ratings. Additionally, section 2.4.2 discusses the seminal studies that explore the relationship between the firm's ESG performance and its share price. Finally, section 2.4.3 highlights the existing studies on the relationship between the corporate credit ratings and share price. This section will emphasize the existing research, the samples used, nations investigated, time horizons, methodology and results pertaining to their study. This critical enlightenment of previous studies will not only emphasize the pertinence of this thesis but also demonstrates the potential for areas of further studies in this field.

2.4.1 ESG and Credit Ratings

Attig et al. (2013) used the scores from MSCI ESG Research, to examine the effect of CSR on a company's credit ratings. The sample consisted of 1,585 firms in the United States between the years 1991 and 2010. An ordered probit regression technique was used keeping credit rating as the dependent variable whereas coverage, margin, size, leverage, capital intensity (ratio of property, plant, and equipment to total assets), beta, and loss were the control variables. The results showed a positive correlation between CSR and credit ratings since an increase in the rating causes a likely reduction in the firm's financing costs, hence enhancing firm and stakeholder value. They also

found that the environmental factor had the most positive impact on credit ratings which is consistent with the findings of Zanin (2022).

Similarly, Stellner et al. (2015) used the ordered logistic regression model to study whether the superior performance in corporate social responsibility, specifically, the ESG would result in better credit ratings and lower credit risk. They analyzed the ESG performance and credit rating awarded to firms with respect to the countries in which they are located. The sample consisted of 872 corporate bonds from non-financial firms in the Economic and Monetary Union (EMU) countries between 2006 and 2012. The firms' ESG ratings were obtained from the Thomson Reuters ASSET 4 ESG and the bond ratings were extracted from S&P and Moody's which was then grouped into seven broad classes ranging from 1 (AAA) to 7 (CCC). The data on ESG country ratings was obtained from Bloomberg for over 175 countries. The study used dummy variables to study the interaction between the country's ESG rating and the ASSET4 company scores to identify the above and below average overall ESG performance. The results showed that a firm was awarded a higher ESG rating if they were in a country that also achieved an above-average ESG performance, indicating a strong relationship.

A European study empirically investigated how the individual dimensions of the firm's ESG performance impact the credit ratings of 56 Spanish and Italian public organizations in the year 2015 (Devalle et al., 2017) They conducted a test based on the ordered logistic regression test using credit rating as dependent variable ranging from AAA to CCC. The independent variables selected were different dimensions of the ESG scores. The purpose of this study was to identify the nexus between credit ratings and ESG performance. The results of this study suggest that the Social and Governance performance influences the credit ratings, whereas Environmental scores do not show much significance. These findings are different to those of Zanin (2022) which could be due to the limited sample and time-period.

Giese and Nagy (2018) investigated the economic aspects related to the markets pricing of the ESG factors and their incorporation of the ESG data. A comparison was conducted of the financial performances of firms with a strong positive ESG movement and those with a strong negative ESG movement. The authors conducted the empirical analysis for comprehending the shape of a corporate valuation model curve which reflected the valuation level of the firms according to their ESG ratings and other parameters. The variables used were the MSCI ESG score, its change in

scores, and the style factors that influence the share prices. Utilizing simulated long-short, indexed portfolios which were rebalanced monthly, the study analyzes the developed markets over the years 2009 to 2018 and the emerging markets from 2013 to 2018. The results indicated that the equity markets responded most sensitively to ESG data for firms with moderate ESG ratings and that they responded with stronger performances during ESG score upgrades as compared to the downgrades, which is related to the steepness of the ESG valuation curve. Hence, the study provided insights into the global markets stock pricings based on the ESG movement. Furthermore, information asymmetry can also arise amongst the corporate and rating agencies when the CSR reports are harder-to-read, causing exacerbated perceived default risk which then leads to decreased credit ratings (Yu and Garg, 2022).

The paper by Cubas-Díaz and Sedano (2018) examined whether credit ratings are impacted by the sustainability measures incorporated by the firms. The ESG variables were used to calculate the sustainability activities of the firm in two areas, the Measure of Commitment-failure (MC) and the Relative Sustainable Performance Measure (RSPM). Meanwhile, a panel of 1008 firms globally was selected between the years 2008 and 2014. The findings of the fixed effects ordered probit analysis implied that the credit ratings of four out of the ten sectors, which include Energy and Basic Materials, were seen to have been positively impacted by ESG performance. Hence, they emphasize the importance of CRAs considering both traditional and advanced quantitative sustainability performance measures when calculating credit ratings.

Bhattacharya and Sharma (2019) examined the impact of the overall ESG disclosure record and the individual ESG factor disclosure score on the credit ratings of companies in India. The sample consisted of 122 companies listed on the S&P Bombay Stock Exchange (BSE)-500. The ESG, environmental, social, and governance disclosure ratings that formed the independent variables were retrieved from the Bloomberg database. The control variables included total debt to total asset ratio, market capitalization, net debt to equity ratio, and percentages of women and independent directors on the board. Using the ordered logistic regression model, they found that the overall ESG disclosure scores had a direct and substantial impact on credit ratings and creditworthiness of the firm. However, the governance score was identified to have a positive but insignificant association with credit ratings. It was also found that the small-to-medium-sized firms benefitted more from the ESG performance measures than the larger firms as they would be viewed as creditworthy.

Kiesel and Lucke (2019) studied the extent to which ESG performance are considered by CRAs in their rating decisions and its influence of the debt and equity markets. They applied the Latent Dirichlet Allocation (LDA) model on 3,719 rating action reports for the period between 2004 to 2015. This method classifies a large set of documents into a single or multiple topics and can measure previously unseen data sample. They identified that the ESG issues are considered up to 2.68% in Moody's rating processes and decisions. Hence, concluded that the corporate governance CRAs consider ESG as a significant element in their credit risk assessment and quality as it deals with the organization's vulnerability against sustainability, default risks and has an impact on long-term performance.

A study by Dorfleitner et al. (2020) specifically investigated the effect of Corporate Social and Environment performance on forecasting credit ratings. The sample included 218 European and 724 North American companies whose S&P credit ratings between 2003 and 2013 were extracted. The Corporate social performance (CSP) of the firms was estimated using the ES score, environmental score, and social score. The study also considered the control variables consisting of the total debt, operating margin, long-term debt, and interest coverage ratios. The threshold model and ordered probit model demonstrated that a strong positive relationship exists between CSP and credit ratings in North America, which indicated that a higher CSP performance correlates with higher credit ratings. However, a contrasting result was shown in European firms where social factors had an impact on credit ratings but not the environmental factors. This is in line with the findings from Kim and Li (2021) where the social pillar from ESG showed a positive impact on credit ratings and the environmental pillar had a negative impact.

An analysis of the ESG performance practices and its impacts on firms in Europe, Asia and North America was studied by Dorfleitner and Grebler (2020). The research sets itself apart by the use of more superior measures such as the corporate social performance (CSP) of Asset 4, identification of source components, regional differentiation, and credit risk models in concurrence with the instrumental variable technique. Endogeneity is mitigated through the two-stage predictor substitution (2SPS) whereby CSP scores are regressed to measure the national business systems, and finally, credit ratings are regressed on this CSP estimate by applying the ordered choice model. The sample consisted of 1212 companies and 7032 firm-year observations, excluding financial organizations as guided by the Thomason Reuters Business Classification, and the credit ratings

were derived from S&P agency. The results found that CSP has an impact on credit ratings with environmental aspect having the most distinctive positive impact, particularly product innovation being the driver factor. By identifying the drivers for CSP impact on credit ratings, investments can be targeted to achieve cost reductions, reduce default risk, and provide higher credit ratings.

Yoo (2021) empirically analyzed the dimensions of non-financial factors that impact credit ratings in South Korea. The sample consisted of 1085 listed firms in Korea over the years 2013 to 2018. The non-financial factors studied were environmental management, environmental strategy, environmental responsibility information, stakeholder communication and environmental performance. Using regression models, the study showed that non-financial environmental factors have a positive effect on credit ratings, and it is more significant in the case of information asymmetry and maturity stages of firms. This research also identified that the CRAs consider the firm's non-financial factors in their rating process and that firms involved in CSR strategies experience lower costs of debt financing.

Srivisal et al. (2021) investigated the relationship of ESG scores with the firm's credit ratings caused by risk mitigation impact. The panel dataset consisted of 318 listed firms in the Tokyo Stock Exchange and Shanghai Stock Exchange during the period 2009 to 2018. The ordered logistics regression model was applied, and the results demonstrated that the ESG performance of Japanese firms is highly associated with receiving a higher credit rating. It was identified that the social pillar had a negative correlation with the credit ratings whereas the environmental and governance factors were seen to be positively associated with the firm's credit ratings. However, no such linkages were observed in the case of Chinese firms which may be due to the dominating roles of the political factors and the limited variation in the available credit rating data. Hence, this indicates that the ESG investments must be carefully practiced as their impact vary depending on the culture and nature of markets.

The study conducted by Aslan et al. (2021) examined the association between ESG and the probability of corporate credit default by converting S&P's credit ratings into default probabilities. The sample comprised 7,776 annual observations of 902 US companies between the periods 2002 and 2017. They used the Ordinary Least Squares (OLS) regression using market-driven control variables to discover that the companies with higher ESG performance result in a significantly reduced probability of credit default and produce higher credit ratings. This identification can also

be correlated with the limited negative shocks within the company; as in the case of lower accidents, reduced negative sales and higher revenue and profitability. This study was limited in the area of lack of ESG data availability and possible survivorship bias as the sample did not include ESG scores of firms who defaulted.

The study conducted by Chodnicka-Jaworska (2021) examined the influence of ESG measures on credit ratings granted to non-financial European companies based on economic sector divisions. Thomson Reuters Database was used to retrieve quarterly data for 9,251 companies from 2010-2020 based on the six factors; the ESG Score, the Environmental Pillar Score, the Social Pillar Score, the Corporate Governance Pillar Score, the ESG Combined Score and the ESG Controversies Score. Analysis was conducted using a linear decomposition model. It was identified that a strong impact exists in the case of Environmental, Social and Corporate Governance Pillar Scores on the Fitch and Moody's ratings, depicting that it can reduce default risk as well as influence the cost of capital. It was discovered that Moody's focus on the ESG measures was due to the strong impact of ESG Score. They concluded that the ESG Controversies Score has a strong impact on the credit ratings for both Moody's and Fitch, respectively. This shows that the larger the ESG risk index, the lower the credit ratings. The analysis of data pre- and post-Covid period identified that the credit rating agencies revised their methodologies for the inclusion of ESG factors during the assessment of credit ratings.

Michalski and Low (2021) investigated the importance of ESG variables for predicting the multi-class firm credit ratings by applying enhanced methods of MDA, MDI, and Tree Shapley Additive exPlanations (TreeSHAP). They used four samples including 1,854 firms in US standard (US-STD) from 1928 to 2019, 741 firms in US ESG standard from 2002 to 2019, 820 firms in Global standard (GLB-STD) from 1995 to 2019 and lastly 594 firms in Global ESG between 2002 and 2019. The performance of the firm's credit ratings was analyzed through a comparison of traditional and sophisticated classifiers. This consisted of the quadratic discriminant analysis (QDA), Bernoulli (BNB), Naïve Bayes-Gaussian (GNB) and the linear discriminant analysis (LDA). The results demonstrated that both the sophisticated and conventional methods had a strong predictive performance using the ESG sample. Therefore, implying that ESG factors are a significant consideration in the credit rating forecast of US and international enterprises.

Kim and Li (2021) used the ESG data for 4,708 publicly traded firms between 1991 to 2013 to run a regression analysis based on the variables of credit rating, ESG scores, debt to equity ratio, liquidity, total assets and return on invested capital. The study found a positive relation between ESG and credit ratings. The authors also used correlation analysis to identify that the social factor has the highest influence on credit ratings, depicting a strong relationship. However, environmental variables were identified to have a negative effect on the credit rating.

Likewise, Fabozzi et al. (2021) explored the influence of ESG on the credit ratings of Japanese companies by obtaining ESG scores for 182 Japanese firms across 33 industry sectors from the Sustainalytics' ESG Rating database between the periods 2009 to 2015. The credit ratings were extracted from the Japan Credit Rating Agency (JCRA) database to attain long-term issuer credit ratings. The control variables include coverage ratio, size, operating profit margin, capital intensity ratio, leverage ratio and beta. Using the ordered probit regression method, they found that there is a strong impact of ESG measures on credit ratings at a significant level of 1%. With respect to the individual pillars, E and G had a stronger effect on the credit ratings as compared to the social pillar.

These findings are in line with the studies conducted by Zanin (2022) on the firms located in Europe, North America, and Asia. The ESG scores were obtained from Refinitiv, and the credit ratings were derived from S&P and Fitch for a period of three years from 2017 to 2019. The sample included 1126 listed firms from the sectors of wholesale and retail trade, manufacturing, information and communication, mining and quarrying, and real estate. A multivariate ordinal logistic regression model was used to jointly estimate the CRA ratings as well as to effectively analyze the drivers of creditworthiness as compared to the classic probit models or the univariate logit models. The conclusion was that the Environmental score was the strongest, depicting resilience to long-term risks and the tendency to be rated well by CRAs. However, mixed results with low significance were identified in the case of Social and Governance scores on credit ratings.

In another recent study by Chodnicka-Jaworska (2022), the effect of ESG on credit ratings of the energy sector was investigated. The primary purpose was to identify whether the ESG measures adopted during the Covid-19 crisis had an influence on the credit ratings. The data on long-term issuer credit ratings was derived from all the companies registered in the stock exchange worldwide. The sample collected from the Refinitiv database consisted of the credit ratings of 2,800 energy sector firms between 1990 and 2021 awarded by Moody's, DRBS and Fitch. The linear

decomposition method was used to identify that the ESG factors indeed had a substantial influence on the credit ratings during the Covid-19 period than before it. This indicates that ESG factors are increasingly becoming a part of the financial market. The results also showed that the environmental factor of ESG has the most significant impact on credit ratings.

C. Li et al. (2022) investigates the effect of firm's ESG performance on its credit ratings and organizational transparency, as well as the contribution of external governance mechanisms on the ESG practices. The sample consists of 19,188 firm annual observations from Chinese A-share listed organizations, excluding the insurance and financial firms, between 2009 and 2020. The assessment measures issued by the Shenzhen Stock Exchange for the information disclosures of the listed firms were included as the proxy variable for corporate transparency. Using the five approaches consisting of Fama-Macbeth model, time series cross-sectional regression with time and industry dummy variables, time series cross-sectional regression with annual dummy, the fixed effects regression and average value of enterprise variables, the results found a significantly positive relation between ESG and credit ratings. Furthermore, through the mediation effect test technique, the research proved the impact of firm transparency to cause an intermediary effect on ESG performances that impacts credit rating.

The importance of CSR information, its readability and its subsequent impact on the firm's credit ratings and cost of borrowing were studied by Yu and Garg (2022). The readability measure was studied through the Fog and Flesch indexes using the CSR reports released by the Fortune 500 firms between 2002 and 2014. The CSR reports was merged with the credit ratings were derived from Compustat and bank loan variables from Dealscan. The financial variables were derived from Compustat, CSR ratings from MSCI ESG KLD STATS, share prices from CSRP and 10-K readability from Loughran and McDonald 10X File Summaries. The final sample consisted of 835 observations for 231 organizations. The results from descriptive statistics and Pearson correlations found firms being awarded higher credit ratings and lower bank loan spreads when they have a better CSR report readability. This indicates that CRAs consider firms with enhanced CSR reports would be having reduced default risk and hence, tend to assign higher credit ratings. Additionally, organizations with higher CSR practices show a stronger positive relation between credit ratings and CSR report readability.

To overcome the challenges of ESG metrics standardization and to reduce model risks from credit ratings, Agosto et al. (2023) proposed a data-driven model to explain the impact of ESG on credit ratings through statistical learning techniques. The Bayesian model was utilized to populate weights for each of the indicators in order to determine the accuracy of each ESG ratings on credit scores. The sample consisted of 1382 European firms, MSCI ESG scores, Refinitiv ESG scores, S&P scores and their firm's risk class based on Bloomberg Issuer Default Risk Model. The proposed model also proved that the ESG scores have a positive impact on credit ratings, with a more sustainable and advanced predictive accuracy taking into account each Environmental, Social and Governance factors. Hence, this research incorporates artificial intelligence and statistical methods for informed study of ESG factors.

2.4.2 ESG and Share Price

Capelle-Blancard and Peti (2019) investigated the impact of ESG news on the stock market's reaction by analyzing dataset from the Covalence EthicalQuote. A sample of 33,000 ESG reports, both positive and negative, from 100 listed organizations between 2002 – 2010 was analyzed using event study methodology, which measures the reaction of shareholders to receiving new information. The regression-based analysis identified that the shareholders respond more to the release of negative ESG information with up to 0.1% drop in the firm's market value. Whereas positive ESG news does not show significant gains in the firm's value. The findings indicate that through the goodwill hypothesis, a firm's good ESG reputation can help mitigate losses whereas, a negative ESG news with economic, sentimental, and quantitative orientation can lead to considerable losses and dropped share prices.

The study conducted by Ender and Brinckmann (2019) examined the impact of CSR-relevant information on the shareholder's value by evaluating its effects on the firm's stock price movements. The sample consisted of the listed organization in the Austrian Traded Index (ATX) over a three-year period from 2015 to 2018 and the CSR information was assessed using the 129 announcements, consisting of 44 negative and 85 positive announcements, about the firm's ESG performance and ratings based on the criteria derived from the MSCI ESG research database. The research used the Bowman's five step phase model of determining the event, building the hypothesis, calculating the abnormal returns and the cumulated abnormal events, the analyzed results found that positive CSR activities results in a positive impact on stock prices in relation to

the cumulated average abnormal returns and vice versa, particularly in the areas of Environment and Social information.

Jia et al. (2019) investigates whether organizations utilize CSR as a tool to insure against potential share price risk. The study was based around the regulatory change of the 2005 Regulation SHO (Reg SHO) which caused an exogenous shock in the share price risk wherein the SEC removed the uptick rule of short selling restrictions from certain randomly selected pilot organizations. The sample includes social ratings from the MSCI ESG KLD STATS, the Russell 3000 Index member companies from FTSE Russell, and short interest information and financial data from S&P Compustat across the period 2003 to 2006, hence, including the periods prior and post to the employment of Reg SHO. The Difference-in-Difference (DiD) regression analyses were run on 5,633 firm-year observations across 1,497 organizations, wherein 3,694 observations were from 985 non-pilot organizations and 1,939 were from 512 pilot organizations. The results found that pilot organizations with greater exogenous risks tend to practice CSR activities more in order to attain mitigative effects from stock price volatility. Hence, there exists a causal relationship between share price risk and managerial incentive to capitalize in CSR activities.

The adverse effects of the 2008 global financial crisis motivated commercial banks to increasingly prioritize their social responsibility practices in order to reinforce their credibility and the stakeholder's trust. Hence, Miralles-Quiros et al. (2019) investigated the information relevancy provided by the ESG activities of the 51 publicly listed commercial banks across 20 stock markets and its impact on the stock prices between the years 2002 to 2015. The results of the Barth and Clinch valuation model identified that investors value environmental and corporate governance as their coefficients were positively associated to the banks share prices whereas the coefficient of the social performance was negatively related to the share prices. Furthermore, the firms' ESG performances are significantly more valued in the common law nations due to the existence of greater shareholder protection. The study finally emphasized the importance of promoting social responsibility in the banking industry as the investor preferences towards sustainability practices have increased post financial crisis.

Ng and Rezaee (2020) studied the impact on organizations' non-financial ESG sustainability performance and disclosure patterns on the stock price informativeness (SPI). This study compiled data from Compustat, MSCI-KLD ESG, the Center for Research in Security Prices (CRSP) and

Bloomberg over the period 2005 to 2015 with a performance sample size of 18,223 and disclosure sample size of 6,632. Utilizing descriptive statistics and a series of robustness tests, while controlling potential correlated variables, the report concluded that the ESG ratings are observed to cause an increase in the idiosyncratic stock price volatility. In situations of weaker economic performance, there is a stronger correlation between the ESG performance and SPI as investors tend to focus on ESG during financial underperformance.

The influence of ESG practice on the volatility of share prices in textile and apparel organizations was examined by Shakil (2020) due to their significant impact on the society and environment, particularly in the developing countries such as India, Bangladesh, Indonesia, and Cambodia. The sample includes 44 global textile and apparel companies obtained from the Refinitiv platform over the periods 2010 to 2018. The author uses legitimacy theory to explain the impact of firm's legitimate ESG actions on the reduction of stock price volatility. The control variables included are the ROA, leverage ratio, firm size, and liquidity ratio. A fixed-effects panel regression model is applied to decrease unobserved endogeneity bias and the findings identified a substantial negative impact of ESG performance on the stock price volatility and market risk of textile and apparel organizations. Hence, it is recommended that managers prioritize ESG matters as it can cause a reduction in the share price volatility. The market volatility in the portfolio can also be leveraged by investing in firms with high performing ESG practices.

The exogenous shock and stock market crisis brought by the Covid-19 pandemic provided an opportunity to test the impacts of environmental and social (ES) practices by considering the theories of investor loyalty and customer preferences. The research by Albuquerque et al. (2020) studied the ES aspects using a sample set which included 134,689 firm-day return observation for 2,171 firms amongst the entire U.S. stocks in the Refinitiv database, the ES ratings were retrieved from Thomson Reuters' Refinitiv ESG platform, daily stock returns sourced from Capital IQ North America Daily for the initial quarter of 2020 and CRSP between 2017 and 2019. The accounting information was extracted from Compustat to build the control variables such as the advertising, Tobin's Q, ROE, size, cash, and leverage. Using Difference-in-Difference (DiD) regression analysis and daily cross-sectional regressions for the initial quarter of 2020, the study identified that the stocks with greater ES ratings and higher advertising expenses were observed to have significantly higher stock returns of 0.45%, superior profit margins and decreased return volatility across the

initial quarter of 2020. Through the parallel trend assumption tests, it was identified that there was not much difference in the returns amongst the high and low ES firm, preceding the Covid-19 pandemic. This supports the resiliency hypothesis whereby organizations with high ES performances depict higher resiliency during crisis.

Interestingly, for Chinese firms listed on both the Shanghai or Shenzhen as A-shares and Hong Kong as H-shares, there is a considerable stock price premium (AH-share premium) on the A-shares, though they are similar in terms of shareholder rights. This motivated Deng et al. (2021) to conduct a study on the influences of CSR reporting and quality on the share price premium. The final sample of 502 observations included China's A + H-share companies during the period 2009-2015 with their daily stock market prices and financial data extracted from CSMAR and WIND, ratings of the firm's CSR report from Rankins CSR Ratings (RKS), and high-frequency trade and quote information were obtained from GTA to analyze the adverse selection component of the bid-ask spread (AS component). The control variables included market capitalization, relative turnover ratio, and percentage of market capitalization of H-shares outstanding. Using Difference-in-Difference regression analysis, the findings identified that the coefficient on CSR is significantly negative at 1%, proposing that companies with CSR reporting disclosure has lower AH-share premiums, particularly due to the reduction in information asymmetry.

Stock price crash caused by a negative skewness in stock return distribution, or a high negative stock return is usually induced by the managers opportunistic release of a stockpile of negative information to the investors after hiding until a certain point. Bae et al. (2021) investigated whether the firm's ESG ratings impact stock prices and the possibility to reduce stock price crash risk. The research analyzed a sample of 3833 dataset from the listed firms in Korean Stock Exchange across 2012 to 2018 and the ESG ratings from the Korea Corporate Governance Service. Using descriptive statistics such as the Pearson correlations and the logistic regressions, the study found that a higher ESG rating is associated with lower risk of stock price crash. Their findings also supported that the higher ESG engaged companies, the lower the chances of resulting in stock price crashes due to the reduced information asymmetry available in the market.

Al-Hiyari and Kolsi (2021) studied the role of ESG in delivering shareholders with value-relevant data beyond financial information for decisions in equity pricing. The sample includes cross-country non-financial publicly listed companies across 10 Middle East and North African (MENA)

region from 2013 to 2018. The country-specific data was obtained from the Worldwide Governance Indicators (WGI) by the World Bank's database whereas, the ESG data was derived from Thomson Reuters Eikon platform for 439 firm-level ESG measures. Using the price valuation model, the study identified that market participants positively priced the ESG performances, and it provides additional information data to earnings and book value of equity (BVE). Alternatively, when the ESG practices were aggregated into its components, it was found that the Governance pillar was the most relevant to shareholders while the environmental practices were irrelevant to them. The price model specification was validated using the return valuation model whereby the results identified that ESG and its components are strongly positively correlated with the share prices, which indicates that ESG performances contain informative data to market participants in the MENA region.

The role of ESG performance during the crisis periods was studied by Broadstock et al. (2021) particularly during the Covid-19 phase as the beginning months of 2020 witnessed a market-wide financial crisis which was triggered by the global pandemic. The ESG ratings were derived from the SynTao Green Finance whereas the firm characteristics variables and stock prices were obtained from the WIND database between the years 2015 to 2020 over the dataset of CSI300 constituents. By characterizing the differentials in trading activities of the CSI300 constituents and the volume of ESG stocks, it was found that the movement of stock prices among low-ESG firms were higher as compared to the high-ESG firms. This indicates that companies with higher ESG ratings are more resilient during the crisis periods. The research also conducted the event study which identified that organizations with higher ESG performance showed smaller declines in stock prices during the pandemic period, hence acting slightly as a form of immunity in times of crisis.

Engelhardt et al. (2021) studied the relationship of ESG with stock performances during periods of Covid-19 crisis based on the stocks volatility and returns. The sample includes 1,452 organizations across 16 various European countries with their ESG ratings extracted from Thomson Reuters Eikon databases and their financial information from the Compustat/Capital IQ. The multivariate regression tool was applied wherein the independent variable was ESG scores and the dependent variable was taken as the stocks returns during the collapse period from February 3, 2020, to March 23, 2020. Furthermore, the impact of CSR on share price volatility was analyzed using idiosyncratic volatility and organization's volatility. The results illustrated that European firms with better CSR ratings has higher capital market outcomes based on greater abnormal stocks returns and minimal

share price volatility during the pandemic period, indicating that they were not highly affected by the Covid-19 economic crisis. Additionally, it was found that the low-trust nations with fewer regulations and disclosure standards need to have higher CSR performances to decrease uncertainty amongst market participants. Hence, firms with greater ESG ratings are associated with better stock performance and higher returns.

Investors have increasingly begun to base their investment decisions on ESG performances of the firm. Wang et al. (2022) investigated this transition's impact on stock price crash risks by using a sample of listed A-share stocks in the Shanghai and Shenzhen Stock Exchanges from 2009 to 2020, excluding the financial industry and firms with asset ratios greater than 1 or lower than 0, to ultimately have a sample size of 27,416. The financial information was extracted from the CSMAR and the ESG ratings from the Hua Zhen index information service Co. Ltd. The model developed considered the stock price crash risk as the dependent variable and the ESG ratings as the independent, along with two indicators, the Negative Coefficient of Skewness (NCS) and Down-to-Up Volatility (DUV). The results of the correlation coefficient of the Pearson and Spearman's ρ identified NCS, DUV and stock price crash risk to be negatively associated with the ESG ratings. Based on the shareholding structure perception, the study identifies that ESG practices provide a greater inhibition in the likelihood of stock price crash risks for firms that are not state-owned and have reduced equity concentration. Furthermore, the Impact Mechanism Test found that the quality of accounting data is observed to be greater when the ESG performance is higher and hence, controlling stock price crash risks.

Liu (2022) investigates the association between ESG practices and share price collapse risk by using a sample of A-share listed firms between 2015 and 2020, excluding the financial industry, ST and delisted firms, as well as those which has an insufficient ESG index. The final sample consisted of 6,642 observations with ESG ratings extracted from the Bloomberg SASB ESG database, and various relevant information from the National Tai'an platform. Using the regression analysis through Stat 16.0 and Excel, the findings depict a significant negative correlation between the firm's ESG performance and share price collapse risk particularly among state-owned firms. This is caused by the reputation effect of these firms with higher profit, political, social responsibilities, voluntary ESG investments and disclosures which subsequently results in effectively preventing stock price crash risk.

Based on the stakeholder theory and information asymmetry theory, Xu et al. (2022) examines the mechanism and effect of ESG data disclosure on the future stock price crash risk of Chinese A-listed firms over the years 2010 to 2019. The sample consisted of 19,056 company year observations, excluding the financial and transfer industries as well as those with less than 30 trading weeks per year. The ESG data is derived from the Bloomberg database whereas control variables are obtained from CSMAR. The stock price crash risk is computed using the negative conditional skewness of returns and the down-to-up volatility of returns. The regression analysis test showed ESG to be significantly negative at 5% level demonstrating that firms with enhanced ESG disclosure can reduce the probability of future stock price crash risk. A series of robustness tests such as the PSM-DID further established the same conclusion. Furthermore, the study analyzed the years of 2012-2015, 2017 and 2019 as bull markets and used the heterogeneity analysis to identify that ESG information reduces stock price crash risk most prominently in firms with increased agency costs, state-owned firms, and bull markets. Hence, this study emphasizes that ESG disclosure reduces information asymmetry, alleviates irrational decision making and subsequently increases reputational capital.

With the distressing impact of Covid-19 on both health and economy worldwide, the stock market experienced a heavy drop, such as the China's stock market which plummeted from 4200 to 3700 points. Hence, Zhou and Zhou (2022) aims to study the relationship between ESG practices and share price volatility under Covid-19 impact. The sample consists of A-share market firms across the trading days December 1, 2019, to March 21, 2020. The MSCI ESG rating scores were obtained from Bloomberg Data Terminal, financial indicators from the Wind financial database and the TobinsQ data from the CSMAR platform. The control variables used were the firm size, leverage, cash holding ratio and TobinsQ. The findings of difference-in-difference (DiD) method and regression analysis illustrated that the higher performing ESG firms have lower stock price volatility during crisis period and stabilizes stock prices. Furthermore, the listed firms experienced volatility pre and post the epidemic period which depicted that companies with enhanced ESG practices had stronger resilience and recovery capability than those with lower ESG performances. Hence, the study recommends firms and investors to allocate assets in firms with higher ESG scores to avoid costly risks and experience lower stock price volatility.

S. Li et al. (2022) investigates the factors that would influence stock price crash risk from the perspective of environment, social and governance, and provides a guidance for investors, managers, and scholars. The sample includes listed firms in Shanghai and Shenzhen A-shared with ESG ratings derived from Bloomberg, MSCI and the WIND databases between 2016 and 2020. The firms in the sample excluded financial organization and ST enterprises and the sample firms' financial information was obtained from the CSMAR platform. The study evaluated the correlation analysis between different rating agencies to find that the correlation coefficients of international agencies above 0.5, which indicates that the international bodies have more similarities and consistent evaluation systems than the local agencies with coefficient below 0.4. The regression analysis from international agencies found that the greater the ESG ratings from international agencies such as the China Alliance of Social Value Investment, FTSE Russell, particularly the MSCI and Bloomberg on Chinese listed firms, the lower the probability of stock price crash risk of these firms. However, the regression coefficients when using local agencies are non-significant to the stock price crash risk. Furthermore, the regression findings depicted that investors are more interested in the environmental practices of the firm as compared to their social indicators, hence, influencing lower stock price crash risk.

The study conducted by Feng et al. (2022) examined the role of ESG in lowering the possibility of stock price crash risk by using evidence from agency and stakeholder theory. The sample consisted of 24,193 observations from the listed companies in China between 2009 and 2020. The dataset for the firms and ESG rating was retrieved from the CSMAR and the Wind Financial Database, respectively. Using descriptive statistics, regression analysis and Hausman tests, the study found that higher ESG ratings are associated with lower possibilities of a stock-price crash. This is justified by the stakeholder theory whereby higher ratings in ESG reflect greater information transparency and reduced hoarding of negative information which results in a lower risk of a stock price crash.

Shanaev and Ghimire (2022) explored the effect of 768 ESG rating changes on the stock returns of 658 publicly traded organization on the US exchange extracted from the MSCI during the period 2016 to 2021. Of the 768 ESG ratings, 552 were upgrades and 196 downgrades wherein 96.92% of the cases these differences were observed by one category. Following the seminal work of Jaffe (1974), this study used the calendar-time portfolio methodology wherein for every month a value-weighted stock portfolio exposed to changes in ESG ratings and its risk-adjusted excess returns is

examined through Capital Asset Pricing Model approach, the Fama-French multi-factor model and the Cahart four-factor model. The results identified that the ESG rating changes had a more prominent impact on ESG leaders than the laggards whereby an upgrade in the ratings was associated with minute positive abnormal returns whereas downgrades were seen to cause a significantly detrimental effect on the stock performance with abnormal returns between 1.0% to 1.4%. Hence, the study implies that ESG rating can positively impact market efficiency and information dissemination.

Kulal et al. (2023) examined the interaction between ESG and share prices and investment performances through a sample of publicly traded firms in India between 2022 to 2018. The ESG data was collected from Bloomberg, MSCI ESG and Sustainalytics whereas the share prices were obtained from CRSP and Compustat. Additionally, ESG metrics were obtained from SASB Standards and the GRI Sustainability Reporting Standards. The study conducted data analysis using correlation, descriptive and regression methods to investigate the relationship between ESG and other variables. It was identified that a significant positive relationship exists between the ESG factors and stock prices, with stronger ESG activities of firms having better investment returns and financial performance as compared to those with weaker ESG performance. This indicates that investors are increasingly aligning their investment interests with that of the firm's sustainability practices, causing an increase in stock prices for those firms with a stronger ESG performance.

The impact of firms' ESG performances on stock price synchronicity was investigated by Hu et al. (2023) whereby a sample was collected from 3459 Chinese listed firm in Shanghai and Shenzhen stock markets spanning over the years from 2010 to 2021. The dataset was retrieved from the China Research Data Service Platforms (CNRDS), China Stock Market & Accounting Research databases (CSMAR) and the Huazheng ESG index systems. The descriptive statistics, robustness test and regression models were used to identify that there exists a significant positive impact of ESG performances on stock price synchronicity. Hence, the inflow of non-financial information in the form of ESG serves as a noise reduction alleviating information asymmetry, irrational behaviors and investor's uncertain expectations which thereby enhances the stock price synchronicity.

Emphasizing on a perspective of sustainability development, the study conducted by H. Wang et al. (2023) focuses on the effect of ESG factors on stock price fragility. The CSMAR database and Huazheng ESG rating was used to collect fund-level and firm-level information as well as the ESG

ratings for all the industries in China except the real estate and banking. The sample consisted of 16,728 organizations between the years 2009 to 2021. The findings from regression analysis demonstrated a negative correlation between ESG performance and stock price fragility. The study also identified that investors' sensitivity to the stock performance is reduced for those stocks with higher ESG performance and they tend to hold those stock for a longer period, hence lowering stock price fragility.

The study conducted by Serafeim and Yoon (2023) investigated the predictive power of ESG ratings on future ESG news and measured the reaction of stock prices to the ESG information released to the market. The sample consisted of 31,854 unique observations with ESG information from the MSCI, Thomson Reuters, Sustainalytics and TruValue Labs Pulse database whereas the firm-level variables and return-related data was constructed using Compustat and CRSP database ranging from January 2010 to June 2018. The findings from descriptive statistics and the Fama-French five factor regression models identified that the firm's ESG ratings have a predictive ability on future ESG news and a positive ESG news generates a positive market reaction whereas a negative ESG news results in a negative market reaction. The study also found that firms with a higher ESG rating are seen to have smaller market reactions to positive news which indicates that the news is already reflected in the stock price. Hence, the investors' reaction relies on the ESG ratings as it indicates the organization's commitment to achieving its ESG outcomes.

The introduction of new ESG regulations such as the SFDR-regulation and the increasing role of insurance industries in the shift to a low-carbon economy and its associated transition risks motivated Tommaso and Mazzuca (2023) to conduct a study on the impact of ESG ratings on the stock prices on of European insurance firms. An event study methodology was used to evaluate the reaction of stock market to the upgrade or downgrade of ESG rating announcements. The sample consisted of 56 insurance firms from 15 countries with their market returns derived from the Datastream and 210 ESG ratings announcements obtained from the Refinitiv ESG Europe database between 2011 and 2021. Each event was analyzed using the Cumulative Abnormal Returns (CAR) coefficient, Wilcoxon, and standard errors, whereby the results found that an upgrade in the ESG ratings showed an increase in the stock prices whereas, a downgrade in ESG ratings decreased the stock prices, which indicates that insurance firms can benefit from ESG performances. This asymmetric response could be due to investors' perception of ESG downgrades to be associated

with a damaged reputation, increased risks or regulatory actions which could impact the firm's financial performance. Furthermore, the study found the Pre-Paris Agreement period from 2015 to 2016 showed the most stock market sensitivity to ESG ratings announcements potentially due to the increased regulatory attention towards ESG during this time.

Li (2023) attempted to study the impact of ESG rating on the stock market performance by using a sample of all the Chinese A-share listed companies, except the financial industry, on the Shanghai and Shenzhen stock exchange across the years 2009 to 2020. The financial data was extracted from the CSMAR platform, whereas the ESG rating was retrieved from the WIND database. The control variables include the proportion of fixed assets to total assets (PPE), leverage, independent director ratio, size, cash flow of operating, board of directors, duality of general manager and chairman and finally the Herfindahl-Hirschman Index. The multivariate linear regression technique based on STATA illustrated that a higher ESG rating results in a higher firm performance, as well as in the reduction of financing constraints, greater risk resistance and enhanced firm reputation which helps to attain a commodity premium. Hence, the consequent higher financial performance influenced by ESG rating ultimately impacts the firm's stock market performance.

2.4.3 Credit Ratings and Share Price

Ryan et al. (2017) studied the reaction of equity markets to the credit rating changes in US based organizations during different economic situations. A final sample of 2,783 credit rating changes were obtained from Moody's CRA over the period 1990 to 2010 in order to include the phases of crisis. The results of standardized cross-sectional test of the events found that credit rating downgrades cause significant share price reaction during both periods of expansion and contraction. Whereas there was no reaction observed for rating upgrades. Furthermore, the findings observed that the negative abnormal returns caused by downgrade information were more pronounced during the contraction periods, due to the larger default probability among smaller firms during recessionary periods.

Amin et al. (2018) investigated the relationship between share price and credit ratings by studying a sample of 82 credit rating upgrades and 9 rating downgrades among the publicly listed Bangladesh firms, rated by the Credit Rating Information and Services Limited (CRISL) between the years 2002 to 2015. The share price was retrieved from the Dhaka Stock Exchange. By employing the event study methodology and multiple regression analysis, the findings revealed that that the stock market

responds positively to credit rating upgrades and shows no significant reaction to rating downgrade announcements. The study indicated that this reaction was caused due to the reduction in the information asymmetry, as a result of the credit rating announcements.

The influence of credit rating changes on share price returns was further examined by Reddy et al. (2019) using a sample of 449 firms from the US organizations listed on the S&P's 500 from 2006 to 2015. Their daily share price data was retrieved from the DataStream platform, whereas the credit ratings for S&P, Moody's and Fitch were obtained from the Thomson One database. The final sample consisted of 1,539 credit rating announcements with 702 upgrades and 657 downgrade announcements. The study further utilized an event study technique to analyze the reaction of the market to changes in the firm's credit ratings. The findings illustrated that the share price reacted significantly to a credit rating downgrade, whereas there was no significant reaction observed during rating upgrade announcements. Furthermore, a comparison of the CRAs' data showed that markets were more sensitive to the Moody's downgrade credit rating announcements. This implies that the information released by Moody's is considered important and relevant to the market.

Mokoaleli-Mokoteli (2019) aimed to understand the influence of credit ratings on share prices in transitional economies, and to identify the financial components that distinguish between the rating upgrades and downgrades. Hence, the study was conducted on the South African firms listed on the Johannesburg Stock Exchange over the years 2005 to 2015. The results from the administered event study methodology found that credit rating upgrades do not cause any influence on the share prices. Whereas credit rating downgrades cause share prices to react negatively, which implies that new sensitive data is released to the market during downgrade announcements. Furthermore, they found firm earnings and interest cover can differentiate between the rating announcements, which indicates that debt issuers can manage their credit ratings by monitoring these financial risks.

Dawar et al. (2021) investigated how the share prices of Indian firms were impacted by the changes in credit rating assessments by analyzing a sample of the top 100 firms on the National Stock Exchange across 10 industrial sectors. The sample included 72 credit rating events comprised of 69% downgrade announcements and 31% downgrade announcements over the years 2009 to 2019. Using an event study methodology, the study found that rating downgrade announcements elicited a stronger market reaction as compared to the upgrade announcements. The findings indicate that

investors have increasingly become more sensitive towards negative information post the financial crisis, causing a stronger reaction to downgrade announcements.

Pagin et al. (2021) aimed to investigate the influence of rating announcements on stock returns, and to identify which rating announcement, i.e. the upgrade or downgrade, has the most impact on the share prices of Brazilian firms listed on Brasil Bolsa Balcao. The sample of 22 firms, which were rated by S&P and Moody's over the years 2002 to 2018 was analyzed using the event study methodology. The findings illustrated that rating upgrades resulted in increased returns during the days before the event, whereas the rating downgrades resulted in increased returns after the event, which implied that the market was anticipating the change in credit ratings. Hence, this study provides institutional investors and portfolio managers with an understanding of the importance of evaluating their investment strategies and considering the influence of ratings on share prices.

On the contrary, the study by Avrutskaya (2021) found opposing results by analyzing the impact of credit rating changes by the Big Three CRAs on the share prices of 49 public joint-stock firms across different industries, traded on the Moscow Stock Exchange in Russia. Rating grade upgrades and downgrades consisted of 109 and 26 cases, respectively. Using the event study methodology, the study found that credit rating upgrades do not cause statistically significant positive abnormal returns whereas credit rating downgrades leads to significant negative abnormal returns. This study indicates that the Russian stock market is inefficient in the semi-strong form and could be characterized as an emerging market.

Even-Tov and Ozel (2021) investigated the reaction of share prices to credit rating changing announcements using the intra-day data issued by Moody's, S&P and Fitch over the period 2001 to 2017. The findings showed that the rating downgrades created a significant price reaction, indicating the release of new information. However, rating upgrades did not trigger any significant price reaction. The Moody's and S&P announcements were observed to produce a higher share price reaction as compared to Fitch. In addition, this study further investigated the trading movement during rating announcements to find that a share price movement occurs prior to the downgrade announcement, which could indicate that there was a release of private information to the market. Hence, the study highlights the significance of ratings decision and the existing drawbacks in rating dissemination.

The study by Le and Duong (2022) emphasizes the notable absence in existing literature about credit rating information. Hence, the authors conducted a study on 24 different industries in the Vietnam stock market from 2012 to 2018, based on the behavioral finance, efficient market hypothesis and information asymmetry theories. To analyze the reaction of the stock market returns and industry indexes, the study used the event study method to record the change in share prices at the time of rating announcements. Utilizing the T-test regression analysis, the study found that share prices are significantly impacted during credit rating announcements, with downgrades eliciting a slower response. This indicates that share prices have not yet fully reflected the data in the market.

With the rapid growth of ESG funds with net flows of 21.4 bn US dollars in 2019 and the growth of investor interest in socially responsible investing, Leite and Uysal (2023) examined the influence of ESG performance on investor's response to stock prices, specifically through the incorporation of new information represented by the firm's credit-ratings. The industry adjusted ESG ratings and the individual subscores for E, S and G were obtained from MSCI for the firms in Russell 3000 Equity Index over the period 2013 to 2018. The credit ratings were obtained from S&P whereas the firm's daily stock returns were derived from the Wharton Research Data Services. Using an event study methodology, it was found that the stock prices react more favorably to a credit-rating upgrade when the firm has a good ESG performance and less favorably if the firm has lower ESG attributes. This could be due to the non-pecuniary halo effect of the investors whereby a higher ESG performance is associated with higher returns and lower risk. Though this contradicts the view of portfolio theory, it aligns with the impact of investors' emotions on decision making, specifically confirmation biases. Moreover, the results demonstrated that only the overall ESG scores were relevant to the stock price reaction as the individual ESG ratings appeared to be inconsequential.

Nguyen et al. (2023) explored the relationship between credit rating downgrades and share price crash risk. The sample consisted of S&P credit ratings data from 33,325 publicly listed firms across 69 countries from 1997 to 2017. The study measures the crash risk using the negative conditional skewness and down-to-up volatility of the firm's weekly returns. Furthermore, information transparency was analyzed utilizing country-level information and firm-level opacity measures. Using panel regression analysis, the study found that there is a negative relationship between credit rating downgrades and share price crash risk. The study indicated that the CRAs significantly contribute to the dissemination of negative news in the market through the release of rating

downgrades. This creates information awareness in the market and thus influences its enhanced stability and decreased probability of share price crash.

2.5 Gaps in the Existing Literature

Based on the literature review, the prevailing studies unveil an apparent gap in the literature related to the sampling methods, models, and methodologies, that examine the relationship between the ESG performance and corporate credit ratings. In addition, the existing studies have mostly investigated the impact of credit rating upgrade and downgrade announcements on the share prices, using event study methodology. This type of event study methodology has limitations in terms of providing information only on the short-term impacts on shareholders, assuming that the market is always efficient, and presenting a complicated method to conduct an event study with cross-national data due to estimation complexity (Vishwakarma and Jajoo, 2021). This thesis aims to bridge the gap by studying the impact of credit ratings on share price with ESG performance as a moderator, using an enhanced methodology known as the panel regression analysis. More evidently, the existing research does not allow for the generalizability of the results due to their limited sampling techniques, geographical locations, and time span of study. This thesis will attempt to close the gap by including the world's four continents except Africa, with data obtained over a span of 15 years using a stratified sampling technique.

Chapter Three

Methodology and Model Development

3.0 Introduction

This chapter includes four sections which initially begin with a detailed description of the sample selection method which was conducted using stratified sampling method. Section 3.1 explains the model development process for the variables involved in examining the impact of ESG on credit ratings. Sections 3.2 and 3.3 discuss the model development to assess the impact of credit ratings on share prices as well as the moderating role of ESG in the relationship between credit ratings and share price. Based on the analyses and hypotheses of the dependent, independent and control variables involved in this study, Section 3.4 creates an empirical model which will build the framework to examine the relationship using regression models.

3.1 Sample of the Study

This section will provide an understanding of the sample of the study using the Saunders Research Onion with regards to the research philosophy, theory development, methodological choice, strategy, time horizon, and finally techniques and procedures, which builds the trajectory of this research towards the model development.

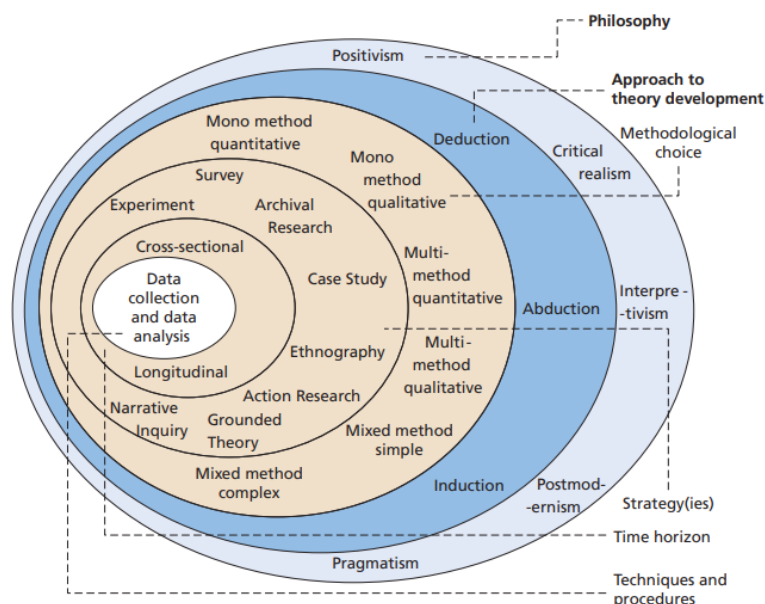


Figure 1. Saunders Research Onion. Adapted from Saunders (2019)

3.1.1 Research Philosophy

The process of designing the research methodology in this thesis follows the model of Saunders research onion, which provides a structured understanding of the research framework. The research philosophy adopted in this thesis is positivism, which is based on the scientific phenomena of observable social reality to develop generalizations which are measurable, unambiguous, and objective (Saunders, 2019). It originates from the studies of Auguste Comte, Francis Bacon, and other 20th century philosophers, commonly identified as Vienna Circle. Positivism philosophy aims to produce research that is independent of human biases to produce results that are quantifiable, neutral, and detached from the human interpretations (Al-Ababneh, 2020). By adopting a positivism philosophy, this thesis will conduct objective analysis and data interpretation, without influencing the research problem under study.

3.1.2 Theory Development

This thesis research employs the deductive reasoning theory which emphasizes theory development through a process of rigorous testing on a series of hypotheses. Propositions are studied by applying and analyzing existing literature to understand the logic of the arguments. This is then followed by designing a research strategy to test the hypothesis, testing the compiled data to investigate the variables, and developing a theory as a result of the data analysis (Saunders, 2019). Similarly, this research will investigate the existing literature review from the previous studies, analyze the theoretical backgrounds, hypothesize the variables, collect the quantitative data to test the hypotheses and evaluate the results in order to deduce the relationship between the variables to develop the theory of the impact of ESG on credit ratings as well as the moderating role of ESG in the relationship between credit ratings and share price. Furthermore, it is integral to align the research approach with the philosophy, and the deductive approach is coherent to the positivist philosophy (Al-Ababneh, 2020). According to Woiceshyn and Daellenbach (2018), the use of deductive research methodology will enable to test the hypotheses, study the causal relationship between variables and produce objective results.

3.1.3 Methodological Choice

This research utilizes a multi-method quantitative data analysis technique, which focuses on analyzing data through the application of more than one data collection process (Saunders et al.,

2024). The data will be collected from credible sources such as the LSEG Data and Analytics platform and the Moody's credit rating agency. Furthermore, a stratified sampling approach will be applied to the data and the final sample will be testing using the Descriptive statistics method, the Correlation analysis, and the Ordinal Logistic Regression approach for model 1, examining the impact between ESG and credit ratings, and the Panel Regression method for model 2, investigating the moderating role of ESG in strengthening the relationship between credit ratings and share price.

3.1.4 Strategy

The research strategy is a plan for undertaking research which supports a researcher with the preparation, execution, and administration of a study (Johannesson and Perjons, 2014). The choice of methodology and the philosophical position of the research will impact the choice of strategy (Mardiana, 2020). Since this research is focused on multi-method quantitative data, the research strategy will be a combination of experimental studies. An experimental study is a systematic approach whereby a deliberate manipulation of the independent variable allows the study of the responses of dependent variable and the identification of possible causal relationships between different variables (Saunders et al., 2024). This research will conduct different experimental analysis on the collected data and analyze the relationship of different firm and country control variables as well as the independent variables on the dependent variable, i.e., ESG performance. The tests and analysis of results have been outlined in Chapter Four.

3.1.5 Time Horizon

The final layer of the Saunder's onion discusses the two-time horizons, namely, the cross-sectional and the longitudinal. The former is based on a snapshot study of the dataset at a specific point in time whereas, the latter is the analysis of a dataset over a series of time period for data comparison (Mendis et al., 2023). This research follows a combination of the cross-sectional and longitudinal time horizon whereby, the data sample consists of a case-by-case observation for each variable over a series of time horizons. This panel data technique enables representation of the cross-sectional dataset observation over a period of time, using models such as STATA, LISREL, NLOGIT, SPSS and SAS (Gil-Garcia and Puron-Cid, 2014). This research will be utilizing the STATA panel model for testing the dataset.

3.1.6 Techniques and Procedures

This thesis will utilize a final sample of 400 firms. A panel dataset is extracted from the global market considering the four continents namely, Asia, Europe, the Americas, and Oceania, during the period 2008 to 2022. The justification is that firstly, the previous studies mostly focus only on firms from either Europe, the United States or Asia (Attig et al., 2013; Chodnicka-Jaworska, 2021; Zanin, 2022). Secondly, based on the previous studies analysis conducted in Chapter Two, there have been no studies which holistically considered all the four continents in their analysis. Thirdly, sustainability has emerged as a global concern and the implementation of ESG disclosure has become the new financial market standard (Chopra et al., 2024). Hence, the study of a global dataset would provide a comprehensive analysis of the results. Lastly, this research does not consider the African continent due to the unstable economic conditions in South Africa and its investment grade is no longer rated by the three globally recognized CRAs. In 2018, the S&P and Fitch classified the status of the country to junk investment, whereas in 2020, Moody's downgraded South Africa to sub-investment grade (Meyer and Mothibi, 2021). Furthermore, the ratings provided by the three CRAs in the African continent are extremely limited and hence, this research does not include the continent due to limited data availability (Pillay and Sikochi, 2022).

For the purpose of this thesis, only the non-financial sectors are considered. This is because the process of modifying the banks' creditworthiness assessment would create a challenge in assigning the weight of each ESG pillar to the organization's value-creation procedures. Hence, compromising a sustainable credit rating system (Brogi et al., 2022). Furthermore, financial sectors constitute the market's supply side, hence possessing a different risk exposure, financial structure, leverage sensitivity and credit risk assessment than those of the non-financial firms (Srivisal et al., 2021). This study will derive the ESG scores from LSEG Data and Analytics platform. This database encompasses greater than 70% of the global market cap, exceeds 500 raw data points and defines scores using a percentile rank methodology at various levels of granularity (Zanin, 2022).

The sample for this study was chosen based on stratified random sampling. The technique of stratified sampling consists of first segmenting a population into strata depending on the similarities in characteristics or attributes identified for that sampling unit in the population, after which samples would be selected randomly from each stratum at a value proportional to the stratum's size in comparison to the population (Qian, 2010). This sampling method attempts to reduce the human

biases in the selection of data samples by using stratified random sampling to identify samples that are highly representative of the population under study. Furthermore, a major benefit of utilizing this technique is that the units are selected for the sample using a probabilistic approach which enables generalizations, i.e. statistical inferences, from the sample to the population, hence providing a greater likelihood of possessing external validity (Sharma, 2017).

According to LSEG Data and Analytics platform, the total number of listed non-financial stocks in Asia, Europe, the Americas, and Oceania is 43,722 as of the beginning of 2024. Following this, the population was segmented into two strata: Continent and GICS sector. Firstly, in stratum one, samples were chosen from each region based on the weight of firms in the continent, i.e., the number of firms in the continent as compared to the full population of 43,722 firms. Secondly, the final sample of 400 firms were selected based on stratum two, which considers the breakdown of the different sectors under GICS. Hence, the final sample based on the GICS sector consists of 237 firms in Asia, 58 firms in Europe, 88 firms in the Americas, and 17 firms in Oceania. Thus, the final sample encompassed a good representation of the different continents and various GICS sectors mimicking the entire population. Please refer to Tables 1 to 3 to check the sample breakdown. A panel dataset was extracted from the LSEG Data and Analytics platform for the period 2008 to 2022.

Table 1. Sample Breakdown

Sample Breakdown		
Country	Population	Final Sample
Asia	25,853	237
Europe	6,368	58
Americas	9,656	88
Oceania	1,845	17
<u>Total</u>	<u>43,722</u>	<u>400</u>

Table 2. Stratum One based on the Continents

Continents	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health care	Information Technology	Communication Services	Utilities	Real Estate	Total
Asia	527	3,253	6,064	4,453	2,038	1,992	4,090	1,160	523	1,753	25,853
Europe	284	533	1,390	866	425	697	886	483	225	579	6,368
Americas	732	1,602	1,309	1,105	630	1,848	1,176	576	259	419	9,656
Oceania	124	812	184	134	88	179	158	64	24	78	1,845
Total	1,667	6,200	8,947	6,558	3,181	4,716	6,310	2,283	1,031	2,829	43,722

Table 3. Stratum Two based on GICS Sector

Continents	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health care	Information Technology	Communication Services	Utilities	Real Estate	Total
Asia	5	30	55	41	19	18	37	11	5	16	237
Europe	3	5	13	8	4	6	8	4	2	5	58
Americas	7	15	12	10	6	17	11	5	2	4	88
Oceania	1	7	2	1	1	2	1	1	0	1	17
Total	15	57	82	60	29	43	58	21	9	26	400

3.2 Model Development for ESG and Credit Ratings

This section of the thesis will discuss the development of the model for examining the impact of ESG and credit ratings. In addition, the independent and control variables will be hypothesized based on previous studies.

3.2.1 Dependent Variable

A dependent variable is one that is being measured in a study, and this variable is influenced by other variables (Alita et al., 2021). Credit rating ($CR_{i,t}$) is the dependent variable chosen in this study.

3.2.1.1 Credit Rating

Credit ratings are an indicator of estimating default risk as the higher the ratings are, the lower would be the likelihood to default and vice versa (Chodnicka-Jaworska, 2022). Investors and regulators consider credit ratings as the benchmark during the evaluation of capital requirements. It also serves as useful information for investment decisions, capital reallocation, and measurement of credit or default risk (Chodnicka-Jaworska, 2022). CRAs award credit rating scores which reflect their evaluation of the company's overall creditworthiness and its capability to meet financial obligations. Credit ratings consider firm-level and market-level data, hence, reflecting the market's attitude towards the company's financial position (Aslan et al., 2021). The chief credit rating agencies globally include Fitch, Standard and Poor's (S&P) and Moody's which rate organizations based on public and private statistics information (Rafay et al., 2018). Moody's credit rating agency was chosen due to the large availability of data of firms across all the continents. Moreover, S&P and Fitch adopt a slightly different rating scale as compared to Moody's as they only consider the firm's default probability as the core measurement of its creditworthiness, whereas Moody's also include data regarding the firm's recovery rates in the event of default (Hirk et al., 2019).

For the purpose of this research, data on credit ratings will be derived from the long-term issuer Moody's database and the ratings description is demonstrated in Table 4 below.

Table 4. Credit Ratings from Moody's Agency

Moody's	Coding for the Rating	Rating Description
Aaa	21	Highest quality with lowest level of credit risk
Aa1	20	High quality with very low credit risk
Aa2	19	
Aa3	18	
A1	17	Upper-Medium grade with low credit risk
A2	16	
A3	15	
Baa1	14	Medium Grade with moderate credit risk and certain speculative characteristics
Baa2	13	
Baa3	12	
Ba1	11	Speculative with substantial credit risk
Ba2	10	
Ba3	9	
B1	8	Speculative with high credit risk
B2	7	
B3	6	
Caa1	5	Speculative of poor standing with very high credit risk
Caa2	4	
Caa3	3	
Ca	2	Highly speculative with likely in, or very near, imminent default. Some possibility of principal and interest recovery.
C	1	In default. Low possibility of principal and interest recovery.

Adapted from Moody's (2024)

3.2.2 Independent Variable

Independent Variables are those that influence the dependent variables (Alita et al., 2021). ESG score ($ESG_{i,t}$) and its individual dimensions, i.e., the environmental score ($ES_{i,t}$), Social Score ($SS_{i,t}$), and the Governance score ($GS_{i,t}$) are the independent variables undertaken in this study to analyze the credit ratings.

3.2.2.1 ESG

The ESG overall score is composed of three pillars which are the Environmental score, Social Score, and the Governance score (Alam et al., 2022; Ashbaugh et al., 2006; Bătae et al., 2020). All scores were extracted from LSEG Data and Analytics platform due to their transparent ESG data framework that assesses firm while controlling for industry and size differences (Mishra et al., 2024). Because the LSEG Data and Analytics platform's ESG score is based on unique ESG magnitude weights and transparency simulation, addresses market capital bias, enables comparative analysis with peer firms, and uses a percentile rank scoring methodology to remove hidden calculations, it is hence most suitable for measuring the firm's ESG performance (Michael et al., 2023). The LSEG ESG scoring method encompasses ten category scores, which are: innovation, resource use, emissions, human rights, community, workforce, management, shareholders, product responsibility, and CSR strategy, which comprehensively build up the three ESG pillars (Azmi et al., 2021; Menicucci and Paolucci, 2023).

The previous studies conducted in this thesis clearly established a strong positive relationship between ESG scores and credit ratings (Bhattacharya and Sharma, 2019; Kiesel and Lucke, 2019; Zanin, 2022). Companies with strong ESG performance are identified to have higher credit ratings and a reduced likelihood of corporate credit default (Aslan et al., 2021). Furthermore, ESG factors cause a significant effect on credit ratings due to the cash flow of debtors, sector risk, and the reduced default probabilities of firms. Hence, the enhancement of ESG factors should result in an increase in the credit ratings of the companies (Chodnicka-Jaworska, 2021). This is similar to the findings by Eliwa et al. (2021) wherein firms with a greater ESG disclosure experienced a higher credit rating due to the decline in the organization's cost of debt which provides a signal of reduced credit risk. Moreover, significant importance is given by investors to the credit ratings when pricing bonds, with higher risk premium associated with lower credit ratings. In the case where there is a

higher credit rating, these investors rely on the ESG information to confirm the issuer's creditworthiness (Huang et al., 2018).

The environmental score takes into account the firms' carbon emissions and score metrics to reflect the firm's practices that cause a negative impact on the environment and climate change. Furthermore, the Environmental aspect is more prominent in the energy sector industry as they are the most sensitive towards the regulations associated with them. The financial industries have an obligation to evaluate the environmental performance of the firms prior to determining the default probability and making investment decisions (Chodnicka-Jaworska, 2022). The study by Srivisal et al. (2021) identified the environmental and governance pillars of the ESG score to be more positively associated with the corporate credit ratings as opposed to the social pillar which depicted a negative relationship to the credit rating.

Social irresponsibility can cause an increase in the financial risk and hinder the firm's performance. Firms which get involved in environmental, social, or governance issues are considered riskier as they are subjected to credibility, legal or financial risks and hence causes a deterioration in the credit ratings (Cioli et al., 2023). The study by Dorfleitner and Grebler (2020) discovers a positive association of social practices to credit ratings, mainly driven by categories such as health, diversity, board member gender diversity and firm performance.

The purpose of corporate governance is to safeguard the rights of the shareholders and to eradicate conflict between shareholders and managers arising from information asymmetry and personal interests. Hence, the quality of corporate governance causes an influence on the organization's credit rating (Lin et al., 2020). There are several previous studies that emphasize the impact of the governance pillar on credit rating (Ashbaugh-Skaife et al., 2006; Bradley et al., 2007; Lin et al., 2020; Tarigan and Amarullah, 2017). These studies have unanimously identified that an enhanced quality of corporate governance results in reduced credit risk due to the decrease in information asymmetry amongst the firm and their external stakeholders and hence, causing an increase in the credit ratings.

H₁: The firm's ESG score is positively associated with the credit rating.

H_{1a}: The firm's Environmental score is positively associated with the credit rating.

H_{1b}: The firm's Social score is positively associated with the credit rating.

H_{1c}: The firm's Governmental score is positively associated with the credit rating.

3.2.3 Control Variables

In order to capture the impact of ESG on a firm's credit ratings, this study will use various firm-level, consisting of EBIT margin ($EBITM_{i,t}$), cash conversion cycle ($CCC_{i,t}$), firm size ($FS_{i,t}$) and leverage ($LVG_{i,t}$), as well as the country-level control variables consisting of inflation ($INF_{i,t}$) and GDP growth ($GDPG_{i,t}$). These are closely related to the credit rating evaluation (Devalle et al., 2017).

3.2.3.1 EBIT Margin

Profitability analysis is an estimation of the firm's return on invested capital which emphasizes the origins, levels, and drivers of the firm's profitability. The evaluation on profitability indicators is often conducted during financial analysis as they are regarded as the highest management effectiveness (Perisa et al., 2017). The most often used indicator is the earnings before interest and taxes, which is a proxy for the firm's operating profitability and it is measured by dividing an organization's earnings before interest and tax by the firm's net revenues (Schoenmaker and Schramade, 2023). It is one of the operating methods that is used by financial analysts to determine the firm's real performance as the net income solely would not be sufficient to provide this information (Adiloglu and Vuran, 2017). Considering the prime role of a firm is to operate the business, it is hence the operating income of EBIT data that is much more essential than the net income. The last portion of the income statement is to calculate the net income whereby the firm takes into consideration the non-operating expenses such as the taxes and interests. However, while evaluating the firm's real performance, these governmental and management related data must be excluded, hence providing the EBIT data (Adiloglu and Vuran, 2017). The EBIT Margin, which is calculated as the EBIT to Total Revenue, is expressed as a percentage whereby the profitability ratio measures how much of the firm's earnings before interest and taxes is retained per cash unit of operating income after paying the operating and regular expenses (Perisa et al., 2017).

The signaling theory indicates that firms with higher ESG disclosure provides a positive signal for investors regarding the firm's performance. Pulino et al. (2022) identified that the ESG disclosure indeed has a positive impact on the firm's performance when measured by the EBIT. A greater investment in sustainable environmental related initiatives, corporate governance and management of human resources provides an indication to consumers regarding the firm's sustainable values.

This in turn creates customer value and willingness to pay a premium price which results in a higher EBIT and hence generates increased profits for the organization (Pulino et al., 2022). Moreover, the investors, stakeholders, governments, creditors, and other stakeholders keep expectations from the firms to practice more in terms of ESG, which then leads to markets rewarding them when these expectations have been met (Aydogmus et al., 2022). Furthermore, larger firms have a better coping ability during variations in profitability and cash flow across periods of crisis. On the contrary, Goss and Roberts (2011) discusses the potential of ESG practices to cause costly deviations in the utilization of the firm's resources and agency issues which arise out of the managers intention of personal benefits through ESG investments. The overinvestment in ESG could cause a decline in profits due to allocation of resources which would have otherwise generated profits, affect higher bond spreads and hence, lower credit ratings. According to Stellner et al. (2015), firms which have a higher profitability in terms of EBIT margin experience reduced default risk and hence results in higher credit ratings and lower credit spreads. The firm's ability to earn profits is positively related to the firm's motivation to pursue a more sustainable business model (Chouaibi et al., 2022). Hence, this research hypothesizes that the firm's EBIT Margin has a positive influence on the credit ratings.

H2: The firm EBIT Margin is positively associated with the credit rating.

3.2.3.2 Cash Conversion Cycle

An essential aspect of managerial accounting and a vital element to an organization's financial success is working capital management, which is the approach to manage current assets and current liabilities (Hogerle et al., 2020). The cash conversion cycle is the most prominent and comprehensive measure to determine the firm's liquidity and working capital management efficiency. The CCC focuses on all decisions related to the receivables, inventory, and payables, in addition to the cash cycle processes of buying and selling (Baafi et al., 2024).

CCC is calculated by adding the days sales outstanding to the days in inventories outstanding minus the days payable outstanding (Khalaf et al., 2023; Barros et al., 2023). Essentially, it is the time taken, in terms of days, from the purchase of raw materials to the point of payment received from sale of finished goods. The longer it takes to complete the cycle, higher would be the investments in the working capital (Singh and Kumar, 2014). For instance, if the time taken for receivable collections is too long, the organization could face liquidity risk and inability to recover payment. Similarly, if there is an increased inventory conversion period, the organization could risk losing

its inventory-carrying cost. Furthermore, an increase in the payable deferral time-period could decrease payment stress whereas, sustaining an elevated level of working capital could result in an opportunity cost from not securing more profitable investments (Chang, 2018). Hence, previous studies have recommended minimizing the length of the CCC cycle, which can result in reducing the capital requirements, minimizing liquidity risk, and ensuring seamless business operations (Hogerle et al., 2020; Nissim, 2021).

The CCC determines not only the production and technological elements of manufacturing products, but also the payment terms for the suppliers and the credit criteria for the customers. It also performs as an indicator for portfolio management, reflects practices in earnings management, portrays financial risk and addresses firm's sustainability concerns (Barros et al., 2022; Figlioli et al., 2024). An essential duty of entrepreneurs is to estimate and analyze the cash flows to determine the cash shortages and excesses through inflows and outflows which formulates the investing strategies and creditor payments, which is essential to maintain firm reputation and protection from bankruptcy (Anser and Malik, 2013). The study by Barros et al. (2022) identifies that organizations with a greater ESG score, specifically in the environmental and social components, function with lower working capital requirements and shorter CCC than that of their competitors. Additionally, organizations that outperform its sustainability ratings have a reduced requirement for cash as compared to the industry average. This portrays that organizations need to pay attention to their sustainability performance as it provides signals to the market, resulting in enhanced cash optimization (Barros et al., 2022). Hence, an increase in the cash conversion cycle will have a negative impact on the firm's credit ratings.

H₃: The firm's Cash Conversion Cycle is negatively associated with the credit rating.

3.2.3.3 Size

Firm size is the most prominently utilized fundamental organizational characteristic in empirical corporate finance (Dang et al., 2018). The study on firm size originates back to when Coase (1937) questioned the effect of organizational boundaries on resource allocation and the determination of these boundaries. Firm size is measured by the natural logarithm of the firm's total assets (Singgih et al., 2018). There are various proxies to measure size which includes the natural logarithm of total assets, natural logarithm of total sales, the natural logarithm of market capitalization, and the total number of employees (Hashmi et al., 2020). However, it is of greater relevance to apply the natural

logarithm of total assets as the value of total assets is regarded as being more stable and capable of precisely reflecting the firm size. The natural logarithm is utilized to minimize the significant difference amongst firms with small and large assets in order to attain a normally distributed total asset (Azaro et al., 2020).

The size of the firm is a significant variable because higher ESG indexes and credit ratings tend to be assigned to bigger entities (Chodnicka-Jaworska, 2022). Economies of scale propose that the size of the firm is positively associated with credit ratings and larger organizations tend to portray more initiatives to invest in CSR to efficiently satisfy stakeholders' demands (Bhojraj and Sengupta, 2003; Bissoondoyal-Bheenick et al., 2023). Due to the presence of diverse interested parties in larger corporations and the necessity to maintain their legitimacy, these companies face the pressure to disclose their ESG performances (Rahman and Alsayegh, 2021). Larger companies also tend to have fewer financial and business risks, resulting in lower credit spreads and higher credit ratings (Oikonomou et al., 2014). However, the practice of the CRAs favoring the firm size over productivity could cost the economy over the long-term as witnessed during the 2008 recession wherein the large firms such as Enron and Worldcom were awarded high credit ratings until shortly before their collapse (Bakhtiari, 2017).

H4: The firm's size is positively associated with the credit rating.

3.2.3.4 Leverage

The leverage of a firm is measured by dividing the end-of-year total debt divided by the end-of-year total assets (Ahmad et al., 2023). It is an essential variable to be studied as it identifies the amount of leverage taken up by the firm and enables an investor to compare the firm with that of its competitors (Alam et al., 2022). Investors pay attention to the leverage ratio as the higher it is, the more likely the firm will be at default risk. This is because more debts are accumulated, lowering the capability to honor those debts, hence impacting the firm's credit rating (Fabozzi et al., 2021). According to Anand et al. (2016), leverage is one of the main factors based on which credit ratings are decided and thus, impacts the optimal capital structure. Companies with higher leverage have an inverse relationship with credit ratings as firms with high leverage ratios are prone to bankruptcy and financial crises (Abuhommous et al., 2022).

The credit rating agencies assign ratings by predominantly relying on financial ratios, with leverage being one of the most key ratios. Moody's CRA determines the firm's credit ratings by calculating

the firms' leverage starting from the Generally Accepted Accounting Principles (GAAP) leverages and then implementing adjustments across eight dimensions of the leverage calculation (Kisgen, 2019). It is essential to understand the association between corporate sustainability and the firm's financial risk, as changes in leverage ratio can impact an organization's financing abilities, investment opportunities, cost of capital, strategic approaches and ultimately the wealth of shareholders. The volatility of net income increases when the firm has a large financial leverage, which incentivizes the managers in a sustainable organization to effectively manage earnings in order to prevent covenant violations and to retain their credit ratings (Gomez-Bezares et al., 2016).

H₅: The firm's leverage is negatively associated with the credit rating.

3.2.3.5 GDP

The country-specific variable used in this thesis is the Gross Domestic Product Growth, which is extracted from the World Bank website. An organization's performance is impacted by the country-specific macro-level situations as favorable economic situations facilitate the opportunity for organizational growth and increase in bottom line. The most extensively examined macro-economic measures are the GDP, GDP growth rate, GDP volatility and the GDP per capita (Kaur et al., 2023). The GDP of a country indicates the value of services and goods that are generated in a fiscal year and represents a standard metric for analyzing economic well-being, growth, and development (Fan et al., 2018). According to Mamilla et al. (2019), there is a linear association between credit rating and GDP which is caused due to the influence on GDP on higher production, consumer consumption which in turn indicates higher purchasing power and output. This positive growth in the economy provides a good signal for organizations to enhance their bottom line and it was observed that an increase in GDP causes a favorable change in credit ratings. The study by Borensztein et al. (2013) also finds that an increase in the GDP volatility causes negative influence on the firm's credit ratings, whereas the higher rates of GDP growth in the country impacts the credit ratings positively. The importance of market efficiency is not only for investors but also for the policymakers as they use this information in the stock market to create policies that enhance the growth of a country (Ang and Weber, 2018). The GDP increase indicates more purchasing power, consumer consumption and output resulting in a lower probability of bond degradation during the period. An increase in GDP indicates higher investment opportunities, causing an upward drive in the stock market (Chikwira and Mohammed, 2023). Moreover, an increase in the GDP of a country

tends to influence positive credit ratings of the companies within that country (Grassaad et al., 2020).

H₆: The country's GDP growth is positively associated with the credit rating.

3.2.3.6 Inflation

Inflation is another country-level control variable, extracted from the World Bank website. It is one of the key economic indicators mandated by the CRAs when assessing the credit ratings as an increase in inflation rate would result in the depreciation of the local currency against the U.S. dollars (Chee et al., 2015). Inflation is related to the average annual consumer price inflation and a high rate is associated with structural challenges in the government's finances. This was first studied by Cantor and Packer (1996) where they found that lower inflation results in higher credit ratings and vice versa. Inflationary money finance is usually adopted when the government is incapable or unwilling to finance the current budgetary expenses through debt issuance or taxes. The effect of inflation on the economy can be seen as being both positive and negative. Australian economists have classified inflation as a monetary phenomenon whereby it impedes savings growth, depreciates fixed capital, reduces purchasing power, manipulates economic forecasts, and deteriorates overall productivity (Girdzijauskas et al., 2022). Inflation was considered purely in the monetary aspect until the emergence of Keynes's theory, which argued that the cause of inflation is the continued escalation in demand even after the attainment of full employment. Proponents of the theory argue that the concept of stable inflation can provide realistic expectations to individuals regarding their income and expenditure as well as motivates them to invest their savings, which in turn stimulates economic growth (Girdzijauskas et al., 2022). However, the impact of inflation on firms is reflected in its operations and the organization's ESG scores whereby, the increase in the consumer price index decreases consumer expenditure. This results in a reduced demand for the organization's goods and hence, diminishing the ESG investments (Hamdi et al., 2022).

H₇: The country's inflation is negatively associated with the credit rating.

3.3 Model Development for Credit Ratings and Share Price with ESG as Moderator

This section of the thesis will discuss the development of the model for examining the impact of credit ratings on share price, as well as the moderating role of ESG in strengthening the relationship between credit ratings and share prices.

3.3.1 Dependent Variable

The share price is the dependent variable which will be used in developing the model.

3.3.1.1 Share Price

The share price is an interestingly dynamic phenomenon which is influenced by various elements, and investors rely on it as a barometer based on which investment decisions are taken (Ramakrishnan et al., 2020). The share price is typically an outcome of investors' estimation of the value of the firm's stock using available information, based on which ask and bid prices are executed in the stock exchanges (Sun et al., 2016). One of the main indicators to measure the market's information efficiency is to study the stock price synchronization, i.e., the level of share price fluctuations in an individual firm in relation to the average fluctuations in the market (Li et al., 2023). The information efficiency perspective views stock price synchronicity as a measure of the degree of integration of firm-specific details with the market-level information. Investors are increasingly basing their investment decisions on the assessment of the ESG performances of the firms and their stocks (Hartzmark and Sussman, 2019). An imbalance between the shareholder's expectation for sustainable business practices and the firm's lack of supply could create a temporary surge in the share price of sustainable firms, which then compels the non-sustainable firms to transition into sustainability in order to gain out of their own enhanced market valuations (Marti et al., 2023). Likewise, Gantchev et al. (2022) find that firms having larger group of sustainable shareholders tend to improve their environmental and social policies even with the slightest divestment due to avoid further divestments, especially if the managers compensation is linked to the firm's share price. The disclosure of high-quality information is a vital foundation for the robust functioning of the capital market and the enhancement of efficiency in market pricing (Xu et al., 2022). In addition, according to the study by Yang and Hu (2023), a better corporate social responsibility performance enhances information transparency and helps to attain a higher credit rating. This information on credit ratings released by a neutral body provides informed signals to the market regarding the financial health of a firm. The rating changes evoked by CRAs must be able to deliver the market an enhanced knowledge about the prospects of an organization's capability to meet its obligations towards the equity holders and creditors (Ryan et al., 2017). Hence, it is essential to understand the share price reaction to the corporate credit rating. Furthermore, the ESG disclosure conveys firm-specific information to the market causing share

prices to reflect this information efficiently (Potharla et al., 2023). The minimization of volatility in stock prices and sustaining stability in the stock market are among the essential elements of sustainable development (H. Wang et al., 2023). This thesis collects the share price information from the closing prices of the 400 firms, retrieved from the LSEG Data and Analytics platform.

3.3.2 Independent Variable

Model 2 undertakes the analysis of the independent variable, credit rating.

3.3.2.1 Credit Rating

The CRAs act as an information intermediary to the investors by assigning credit ratings to the firms. This facilitates the exchange and usage of the firm's verified and analyzed original data as well as the new data, which incorporates value to the complete set of information used by investors for making their transactional decisions (Lu, 2024). The firms provide privileged informational access to these agencies due to their hesitance to release private data, even the positive performances, in order to inhibit leakage of sensitive data to the competitors (Kenjegaliev et al., 2016). Credit ratings offer a forward-looking evaluation of an organization's credit risk and its relative capacity to fulfill its financial obligations, which influences investors on decisions regarding security investments (Reddy et al., 2019). If the information released by the credit ratings reveals new and relevant information, then the financial markets are expected to be impacted by the rating announcements (Amin et al., 2018). This data could also result in generating a two-fold impact on a firm's future share price crash risk. The market's reaction to credit rating announcements is expected to be observed through the change in share prices traded in the market. The market could encounter substantial volatility if this data could not be attained from any other source, which indicates that the data has not been reflected in the current share price. Hence, this provides a method to also assess the market's efficiency (Le and Duong, 2022). The credit rating changes and downgrades could facilitate the release of bad news in the equity markets serving as early warning signals and hence, minimizing the probability of future stock price crash risk and maintaining the market stability (Nguyen et al., 2023). On the contrary, Reddy et al. (2019) find that the market reaction is significant when there is a credit rating downgrade whereas an upward rating does not significantly impact the share price. This could be due to the organization's preference to disclose favorable data more rapidly and hence, not providing fresh data to the investors. The study by Leite and Uysal (2023) finds that the positive credit rating changes cause

an increase in the share prices whereas the negative credit rating changes influence a decrease in the share prices. They have however also found that other firm factors such as the ESG can explain the market reaction to credit rating changes. This thesis will explore the impact of credit ratings on the share prices and specifically, the role of ESG in its moderation.

H₁: Credit ratings are positively associated with the firm's share price.

3.3.3 Moderating Variable

The moderating variable used in this thesis is the ESG score and its individual dimensions i.e., environmental, social and governance score. Moderation occurs in a situation where the relationship between two constructs differs based upon the third variable, known as the moderator variable. This moderator variable alters the strength, or even the direction of the relationship amongst the two constructs in the model (Jr. et al, 2021). Similarly, this thesis examines the moderating role of ESG and its dimensions in strengthening the relationship between credit ratings and share price.

3.3.3.1 ESG

The previous studies conducted in this research provide evident results that establish a strong relationship between ESG and share price (Bae et al., 2021; Capelle-Blancard and Peti, 2019; Shakil, 2020). The reciprocal relationship between an organization and its stakeholders can be observed through their contribution to an organization's value creation and the impact of the firm's risks and activities on the stakeholders' wellbeing (Ng and Rezaee, 2020). The performance of ESG sustainability dimensions is driven by both the stakeholders and the shareholders (Moser and Martin, 2012). The study by Kumar et al. (2016) illustrates that firms which comply with ESG practices experience reduced volatility in their stock performances in comparison to their industry peers, with ESG compliant and higher rated ESG firms receiving a greater risk-adjusted returns. Grewal et al. (2021) identified that firms with higher exposure to ESG concerns and risks along with a greater analyst and investor community with the capabilities to process information were observed to have a greater impact on the stock prices during the sustainability disclosures. The preferences by investors for stocks of firms with ESG attributes could also impact the weight they assign towards new information unrelated to ESG, as they tend to make investment decisions that are aligned with their values. Hence, ESG disclosure of the firm indirectly impacts the share prices by moderating how new data such as the organization's credit ratings upgrades and downgrades is accounted into the share prices (Leite and Uysal, 2023).

The environmental component also contributes to the volatility of stocks in the market and firms can safeguard itself against the probability of a stock price crash risk by focusing on the environmental factors such as pollution minimization and trading provisions (Wu and Hu, 2019). Firms build their citizenship image by disclosing ESG data related to green environment and low-carbon emissions, which not only conveys their diligence to environmental and social responsibilities, but also delivers a selfless signal to the stakeholders. This builds the firms' long-term reputation, increases investors tolerances, and provides a buffering effect for the investors during periods of negative news and hence helps mitigate the likelihood of stock price collapse in the future (Xu et al., 2022).

The share price of firms is influenced by the individual dimensions of the ESG factors. For instance, the study by Friedman and Heinle (2016) identified that the individual social performance component can influence strong CSR results which incentivizes managers to invest in projects that maximize share price. On the contrary, Yang (2022) presents the concerns related to practices of greenwashing during rising demand for socially responsible behavior. The investors may rely on the firms' distorted CSR ratings, and the credit ratings provided by the CRAs with negligence towards the informational content of these ratings. Hence, the social ratings act as the moderator by impacting the quality of the ratings and the investors' perception.

Governance ratings indicate the efficiency of the corporate governance practices within the firm to safeguard stakeholders' interests and generate shareholder value. Regulatory policies such as the Dodd-Frank Act of 2010 and the Sarbanes-Oxley Act of 2002 were introduced to enhance corporate governance mechanisms by establishing duties and responsibilities of corporate gatekeepers such as the auditors, directors, and the management (Rezaee, 2016). Managers are continually motivated to green operations and initiatives due to increasing public monitoring and establishment of attainable commitment goals. These positive signals bring forth financial and reputational rewards in the forms of easier financing access and higher credit ratings respectively (Liu et al., 2022).

H2: The ESG score moderates the relationship between credit ratings and share price.

H2a: The Environmental score moderates the relationship between credit ratings and share price.

H2b: The Social score moderates the relationship between credit ratings and share price.

H_{2c}: The Governance score moderates the relationship between credit ratings and share price.

3.3.4 Control Variables

In order to study the impact of credit ratings on a firm's share price, and to examine the moderating role of ESG between credit ratings and share price, this study will use a specific set of control variables. The firm-level variables consist of EBIT margin ($EBIT_{i,t}$), firm size ($FS_{i,t}$), and leverage ($LVG_{i,t}$), whereas the country-level control variables consist of inflation ($INF_{i,t}$) and GDP growth ($GDPG_{i,t}$).

3.3.4.1 EBIT Margin

Firms operate to achieve the targeted maximum profit which enhances the welfare of the stakeholders, employees, product quality and the ability to make new investments (Choiriya et al., 2020). Organizations with higher profitability ratio have a better capacity to achieve high profits which attracts the investors and consequently results in an increase in the firm's share price (Satryo et al., 2016). The profitability ratio used in this research is the EBIT margin. Investors are concerned with the EBIT margin of a firm as it portrays the health of a firm's core activities, ability to function effectively, and the capacity to meet its financial commitments (Suroso, 2021). Payne et al. (2016) also finds that the higher variation in EBIT is associated with a lower share price liquidity most notably in terms of the trading volume and the number of shares traded. This could be because investors base their investment decisions by taking into consideration the performance of a particular stock by evaluating the firm's EBIT volatility across the years (Udomsirikul et al., 2011). According to the signaling theory, the investors find firms with higher profitability to be capable of managing their resources and distributing income in the form of dividends and hence, these investors become motivated to own the firm's shares (Fajaria and Isnalita, 2018). Additionally, when an organization is considered as profitable in the future, it serves as an indication for higher returns on capital which encourages investors to invest in the firm and ultimately resulting in an increase in the firm's share price (Nurhaida et al., 2019). Furthermore, findings by Ademi and Klungseth (2022) suggest that the firms' adoption of ESG practices that are superior to that of their industry peers can result in maximizing profitability and enhancing its market valuation, hence producing better market and financial outcomes. Hence, this research develops the hypothesis that the firms' EBIT margin has a positive relationship with its share price.

H₃: The firm's EBIT Margin is positively associated with the share price.

3.3.4.2 Firm Size

Firm size assumes a significant role in elevating the organization's ESG performance, whereby a greater ESG performance develops an insurance-like guarantee and favorable image in the view of the shareholders. This positive reputation provides the firm with the ability to manage the stock price volatility and crash risk (Shakil, 2020). Furthermore, the share price of a firm is influenced by the firm size, whereby investors consider the scale of a firm to make investment decisions, hence indicating the significance of firm size (Sitorus et al., 2021). Firms that have substantial total assets suggests that they have arrived at their maturity stage, produce greater profits, positive cash flow and have favorable opportunities over a relatively long period of time as compared to the firms with smaller total assets, which in turn increases the firm's value (Husna and Satria, 2019; Nugraha and Riyadhi, 2019). The large amount of assets in the big organizations tend to obtain investors' trust as they are considered to efficiently manage their assets and capable of converting their investments into profits. This increase in the investors' confidence enhances the firm's value and its share prices in the market (Sukesti et al., 2021). Investors decide to invest in a firm to earn profits per share through the closing stock price which thereby motivates the investors to assess firms that have an increase in their total equity. Each increase must be accompanied by an increase in the firm's total assets and this yearly increase has an impact on the firm's share price. Therefore, the investors analyze the firm by calculating its size prior to purchasing shares of a company (Ariesa et al., 2020). It can be hypothesized from the discussion that the growth in the firm's size is expected to have a positive relationship with the firm's share price.

H4: The firm size is positively associated with the share price.

3.3.4.3 Leverage

Financial leverage is the utilization of borrowed funds to undertake an investment to gain its returns in order to modify the firm's cash flow and its financial position (Abdullah et al., 2015). When firms raise capital using debt, a periodic interest payment is required from the firm and an increase in these payments could reduce the earnings available to shareholders which thereby shifts investor preferences to firms with reduced debt (Gautam, 2017). In theory, leverage is negatively associated with a firm's value and investors tend to be cautious of stocks with higher leverages due to its relatively high investment risks (Rachmi and Heykal, 2020). The leverage ratio assesses the degree to which the firm has been financed by debt or external sources using the firm's capability. A high

leverage ratio would indicate that it has been heavily funded by the creditors which makes the investors hesitant due to the substantial risk. Hence, the firm must be able to balance how much is the optimal level of debt and the sources to acquire these debts (Sholatika and Triyono, 2022). Firms with higher ESG ratings tend to reduce their leverage ratio as they have greater growth perspectives and hence would prefer to eliminate high levels of debt in order not to relinquish opportunities for profitable investments and to appear attractive to its stakeholders (Asimakopoulos et al., 2023). Furthermore, higher firm leverages influence a volatility in stock returns, whereby the riskiness of the residual claim of equity holders depends on the firm's leverage, which can be observed with lower stock prices in situations of higher leverage accompanied by high volatilities (Murata and Hamori, 2021; Rathgeber et al., 2021). Based on this theoretical interpretation, this research hypothesis shows that an increase in the firm's leverage will have a negative impact on the share prices.

H₅: The firm leverage is negatively associated with the share price.

3.3.4.4 GDP

An ideal business management would evaluate the impact of multi macro variables on the share price, and its contribution towards enhancing firm growth, management of financial risk and economic policies for promoting economic growth and stabilization of macroeconomic components (Huy et al., 2020a). The speed of GDP growth, inflation rates, fiscal position, exchange rates, debt status and money supply are all essential components in an economy's growth. In macroeconomic terminology, quarterly GDP figures are among the most essential elements of real-time data to which many agents pay considerable attention and evolve their behavior in response to the data received (Funashima et al., 2020). Considering that the stock exchanges consist of significant quantities of market liquidity and are an indicator of growth in the economy, studies relating them with GDP has been of great importance for both industries and investors (Verma and Bansal, 2021). Since the business cycle of an economy do not remain consistent all the time, the macroeconomic variables such as GDP plays a predictor role on the stock market performance (Islam et al., 2023). A study by Khoury et al. (2023) conducted in the Middle East, North Africa, and Turkiye (MENAT) region attained the results that GDP has negative impact on the Tobin's Q stock return. Likewise, the findings in the study by Menicucci and Paolucci (2023) reported GDP to negatively influence the stock return.

H₆: The GDP growth is negatively associated with the share price.

3.3.4.5 Inflation

The stock price of an organization is not just impacted by the firm performance, dividends, and operations, but also by macroeconomic factors. Inflation rate is a key macroeconomic variable which has a high impact on the stock market, whereby, investors experience money illusion as they tend to discount real cash flows utilizing nominal discount rates which results in behavioral issues resulting in inflation-induced valuation errors. Hence, undervaluing the stock market and causing a negative relation with the stock prices (Eldomiaty et al., 2020). Nelson (1976) argued that stock returns are negatively impacted by both the anticipated and the unanticipated inflation. Its negative impact on investment returns is due to the increased demand in a growing economy which ultimately exceeds the available supply and increases the price of goods, hence leading to elevated inflation. Investors consider this as a threat due to the impact on their savings and decreased investment returns as it would have to be maintained at the rate of inflation in order to increase their purchasing power (Mamilla et al., 2019). Good news such as low inflation, increased GDP growth and steady interest rates can influence an increase in investor confidence and hence boost up share prices (Raza, et al., 2023). During periods of high inflation, there is a decline in consumption, purchasing power and investments, whereas during periods of low inflation, the firms inflate their revenues and reduce their value. The US Fed hence attempts to maintain GDP growth at a reduced level due to real return being equal to nominal return minus inflation (Huy et al., 2020b).

H₇: Inflation is negatively associated with the share price.

3.4 Empirical Model

Model 1 for Credit Rating will analyze the impact of the ESG scores on the credit ratings in the presence of control variables by developing several econometric models using the descriptive statistics, correlation matrix, and the ordinal-logistic regression model. The predominant model used in previous studies for this analysis is the ordinal-logistic regression model (Bhattacharya and Sharma, 2019; Devalle et al., 2017; Zanin, 2022). This estimation technique is mostly utilized to test the association amongst a categorical variable and one or more continuous or categorical variables (Lucia et al., 2020). The ordinal-logistic regression model is the appropriate technique for this study due to the nature of the dependent variable, corporate credit ratings, which is based on ordinal ranking. The corporate credit ratings, which were obtained from Moody's, are generated

based on a forward-looking perspective on the overall creditworthiness of an organization (Hirk et al., 2019). This thesis encoded the Moody's credit ratings into meaningful ordinal values, assigning 1 for the lowest rating C all the way up to the value 21 assigned to the highest rating Aaa, as outlined in table 4.

Hence, the model for credit ratings consists of five equations, beginning with examining the impact of the overall ESG score on credit ratings and then followed by the impact of each of the ESG pillars, i.e., the environment, social, and governance, on credit ratings in the presence of firm-specific and country-specific control variables.

Model 2 for Share Price will examine the moderating role of ESG in strengthening the relationship between corporate credit ratings and share price in the presence of a unique set of control variables by developing the econometric models using the descriptive statistics, correlation matrix, and the panel regression model. The panel regression model effectively controls the heterogeneity in the individual organizations within the sample, and hence mitigating the likelihood of biased outcomes. In addition, this model minimizes collinearity amongst variables by delivering more pertinent data from a combination of both the time-series and cross-sectional components (Ademi and Klungseth, 2022). The panel regression technique is the most suitable for this study as the variables are panel data. Therefore, this model facilitates gaining robust insights into the relationship between corporate credit ratings and share price as well as the moderating role of ESG in strengthening their relationship, by using time-series and cross-sectional data across the years 2008 to 2022 from 400 different firms.

Hence, the model for share price consists of six equations, which initially studies the impact of corporate credit ratings on the share price. This is then followed by examining the moderating role of the overall ESG score and its individual components in strengthening the relationship between corporate credit ratings and share price, using the equations 3 to 6 in the presence of firm-specific and country-specific variables.

Model 1. Dependent Variable: Credit Rating

$$CR_{t,i} = \alpha_0 + \beta_1 CCC_{t,i} + \beta_2 FS_{t,i} + \beta_3 LVG_{t,i} + \beta_4 EBITM_{t,i} + \beta_5 GDPG_{t,i} + \beta_6 INF_{t,i} + \varepsilon_{t,i} \quad (1)$$

$$CR_{t,i} = \alpha_0 + \beta_1 ESGS_{t,i} + \beta_2 CCC_{t,i} + \beta_3 FS_{t,i} + \beta_4 LVG_{t,i} + \beta_5 EBITM_{t,i} + \beta_6 GDPG_{t,i} + \beta_7 INF_{t,i} + \varepsilon_{t,i} \quad (2)$$

$$CR_{t,i} = \alpha_0 + \beta_1 ES_{t,i} + \beta_2 CCC_{t,i} + \beta_3 FS_{t,i} + \beta_4 LVG_{t,i} + \beta_5 EBITM_{t,i} + \beta_6 GDPG_{t,i} + \beta_7 INF_{t,i} + \varepsilon_{t,i} \quad (3)$$

$$CR_{t,i} = \alpha_0 + \beta_1 SS_{t,i} + \beta_2 CCC_{t,i} + \beta_3 FS_{t,i} + \beta_4 LVG_{t,i} + \beta_5 EBITM_{t,i} + \beta_6 GDPG_{t,i} + \beta_7 INF_{t,i} + \varepsilon_{t,i} \quad (4)$$

$$CR_{t,i} = \alpha_0 + \beta_1 GS_{t,i} + \beta_2 CCC_{t,i} + \beta_3 FS_{t,i} + \beta_4 LVG_{t,i} + \beta_5 EBITM_{t,i} + \beta_6 GDPG_{t,i} + \beta_7 INF_{t,i} + \varepsilon_{t,i} \quad (5)$$

Model 2. Dependent Variable: Share Price

$$Log(SP)_{t,i} = \alpha_0 + \beta_1 EBITM_{t,i} + \beta_2 LVG_{t,i} + \beta_3 FS_{t,i} + \beta_4 GDPG_{t,i} + \beta_5 INF_{t,i} + \varepsilon_{t,i} \quad (1)$$

$$Log(SP)_{t,i} = \alpha_0 + \beta_1 CR_{t,i} + \beta_2 EBITM_{t,i} + \beta_3 LVG_{t,i} + \beta_4 FS_{t,i} + \beta_5 GDPG_{t,i} + \beta_6 INF_{t,i} + \varepsilon_{t,i} \quad (2)$$

$$Log(SP)_{t,i} = \alpha_0 + \beta_1 CR_{t,i} + \beta_2 ESGS_{t,i} + \beta_3 CR * ESGS_{t,i} + \beta_4 EBITM_{t,i} + \beta_5 LVG_{t,i} + \beta_6 FS_{t,i} + \beta_7 GDPG_{t,i} + \beta_8 INF_{t,i} + \varepsilon_{t,i} \quad (3)$$

$$Log(SP)_{t,i} = \alpha_0 + \beta_1 CR_{t,i} + \beta_2 ES_{t,i} + \beta_3 CR * ES_{t,i} + \beta_4 EBITM_{t,i} + \beta_5 LVG_{t,i} + \beta_6 FS_{t,i} + \beta_7 GDPG_{t,i} + \beta_8 INF_{t,i} + \varepsilon_{t,i} \quad (4)$$

$$Log(SP)_{t,i} = \alpha_0 + \beta_1 CR_{t,i} + \beta_2 SS_{t,i} + \beta_3 CR * SS_{t,i} + \beta_4 EBITM_{t,i} + \beta_5 LVG_{t,i} + \beta_6 FS_{t,i} + \beta_7 GDPG_{t,i} + \beta_8 INF_{t,i} + \varepsilon_{t,i} \quad (5)$$

$$Log(SP)_{t,i} = \alpha_0 + \beta_1 CR_{t,i} + \beta_2 GS_{t,i} + \beta_3 CR * GS_{t,i} + \beta_4 EBITM_{t,i} + \beta_5 LVG_{t,i} + \beta_6 FS_{t,i} + \beta_7 GDPG_{t,i} + \beta_8 INF_{t,i} + \varepsilon_{t,i} \quad (6)$$

Where, t indicates the period of study, i is the i^{th} firm and ε represents the error terms. A brief description of the variables is provided in table 5 below.

Table 5. Description of Variables

Variable	Abbreviation	Measurement	References
Credit Rating	CR	Moody's credit rating of the firm.	Chodnicka-Jaworska (2022); Devalle et al. (2017)
ESG Scores	ESGS	LSEG Data and Analytics platform overall ESG rating of the firm.	Barth et al. (2022); Chodnicka-Jaworska (2021); Stellner et al. (2015)
Environmental Pillar Score	ES	LSEG Data and Analytics platform Environmental pillar rating of the firm.	Barth et al. (2022); Stellner et al. (2015)
Social Pillar Score	SS	LSEG Data and Analytics platform Social pillar rating of the firm.	Barth et al. (2022); Stellner et al. (2015)
Governance Pillar Score	GS	LSEG Data and Analytics platform Governance pillar rating of the firm.	Barth et al. (2022); Stellner et al. (2015)
Share Price	Log(SP)	Closing price of the firm.	Josic and Mlinaric (2018); Kenjegaliev et al. (2016)
Earnings Before Interest and Taxes Margin	EBITM	Earnings before interest and taxes divided by Total Revenue.	Ademi and Klungseth (2022); Chodnicka-Jaworska (2022); Stellner et al. (2015)
Cash Conversion Cycle	CCC	Average inventory days + Average receivables collection days – Average payables payment days.	Abuhommous et al. 2022); Chodnicka-Jaworska (2022); Kerem and Sargon (2021)
Leverage	LVG	End-of-Year Total Debt divided by End-of-Year Total Assets.	Abuhommous et al. (2022); Dong et al. (2021)
Firm Size	FS	Natural logarithm of End-of-Year Total Assets.	Abuhommous et al. (2022); Cubas-Díaz and Sedano (2018); Dong et al. (2021)
Country Gross Domestic Profit Growth Rate	GDPG	Country's GDP annual growth rate.	Borensztein et al. (2013); Chodnicka-Jaworska (2022)
Country Inflation	INF	Country's inflation rate for a particular year.	Chee et al. (2015); Girdzijauskas et al. (2022);

Chapter Four

Results, Analysis and Discussion

4.0 Introduction

This chapter consists of two sections which will provide a comprehensive analysis of the empirical findings based on the previously developed models. Section 4.1 begins with the analysis of the descriptive statistics results for models 1 and 2, which will provide a comprehensive summary of the characteristics and distributions within the dataset. Section 4.2 then discusses the first model wherein the results of the correlation matrix and the Ordinal-Logistic regression analysis will be carefully analyzed in light of the existing literature and theoretical framework to examine the impact of ESG on credit ratings. In addition, a robustness test will be conducted to confirm the validity of the findings of this study. Following this, Section 4.2 examines the second model using sophisticated techniques including correlation matrix and Panel Regression analysis. These results are critically interpreted within the context of relevant literature to present an understanding of the relationship between credit ratings and share price. Finally, the moderating role of ESG between credit ratings and share price is analyzed using these empirical findings.

4.1 Descriptive Statistics Results for Models 1 and 2

Table 6 outlines the descriptive statistics including the means, standard deviations, minimum values, and maximum values of all the variables involved in model 1 and model 2. The dependent variables analyzed in this study are the share prices and credit ratings. As observed, there is a wide variation between the minimum and maximum values in the share price with \$0.005 and \$1,870.292, respectively. Since the sample is collected during the years 2008 to 2022, there were many historical events in the stock market, which could explain the large gap in the stock prices. For instance, the global financial crisis in 2008, the stock market disaster in 2015, and the most recent Covid-19 pandemic in 2020 (He et al., 2022). Due to this large variation, this study used a technique of transforming the share price variable to improve the linear fit of the model, rectify any outliers and solve assumption failures in terms of linearity, normality, homoscedasticity, and homogeneity (Schreiber-Gregory and Bader, 2018). The transformed variable in the form of natural logarithm of share price was then used to analyze the sample set. The results show that the mean stock price is 2.312 with a standard deviation of 1.816 which indicates that there is a significant

variation in the stock prices in the sample, which is expected due to the fluctuations in individual stock prices due to a range of financial, economic, political, and global aspects (Raza et al., 2023).

The standard deviation for the Moody's credit ratings is 3 with an average rating around 13 corresponding to a Baa2 credit rating, while the sample includes a large gap with a minimum rating of 1 and a maximum of 21 which represents C and Aaa ratings, respectively. This indicates that the sample consists of a large range of firms with varying performances rated by the CRAs during the period of analysis. This variation is essential to investigate the impact of ESG commitment on credit ratings. The CRAs assign rating upgrades or downgrades based on the firm's fundamental data on balance sheet, cash flow or other risk factors that must be priced by the market and may influence the share prices (Leite and Uysal, 2023).

The standard deviation of 20.88 is seen to be high for the ESG scores with a minimum of 2.17 and a maximum of 95.76, which indicates that the organizations in the sample have high variability in their commitment towards ESG. This is supported by the study conducted by Ouchen (2022) wherein the standard deviation for ESG exceeded 20% due to the volatility in the energy sector caused by rapid fluctuation in oil prices. Similarly, the sample in this research includes energy sectors which explain the findings. The individual components of the ESG, i.e., the environment, social and governance factors are observed to have similar standard deviations of 27.22, 24.932 and 22.311 respectively, which indicates that they have almost the same variability. However, in terms of the mean performance, the governance pillar indicates a superior mean performance of 58.36 in comparison to the other pillars and ESG as a whole.

The maximum and minimum values for EBIT margin are 0.963 and -1.592 respectively, which indicates a large variation in profitability amongst firms. Furthermore, the mean value is 0.147 and the standard deviation 0.159 which depicts that the firms in the sample yields EBIT margins of 14.7% on an average. These support the findings by Oliveira and Basso (2024) who identified that firms attempt to increase their credit ratings by strengthening their financial position through improved profitability and reporting.

The average cash conversion cycle is 65.21 days with a standard deviation of 107.23 days. The maximum and minimum values are 625.25 and -493.42 days, respectively, which signifies a large variation in the number of days as compared to the mean of CCC. These results are similar to the findings by Marisetty and Madasu (2020) on manufacturing firms in the S&P Bombay Stock

Exchange SENSEX. A positive CCC is generally associated with the number of days taken by a firm to pay its suppliers due to the longer time taken to receive payment from their customers, which hence would require the firms to borrow funds or reserve capital. Whereas a negative CCC is linked with the firms having already received their payments from customers prior to paying its suppliers and hence, the primary aim of the organization is to shorten their CCC (Olaoye et al., 2019). It can be observed from the results that the firms in the sample maintain an average of 65 cash conversion cycle days.

Table 6. Descriptive Statistics

Descriptive Statistics				
Variables	Mean	Std. Dev	Min	Max
Dependent Variables: Share Price and Credit Rating				
Stock Price (in USD)	38.453	97.234	0.0050	1,870.292
Log(SP)	2.3115	1.8160	-5.282	7.533
CR	13.3887	3.0038	1	21
Independent Variables				
ESGS	57.384	20.881	2.172	95.765
ES	55.814	27.223	1.4403	98.479
SS	56.634	24.932	1.1872	98.469
GS	58.358	22.311	1.4714	98.557
Firm-Specific Control Variables				
EBITM	0.1476	0.1587	-1.5922	0.9630
CCC	65.21	107.23	-493.42	625.25
LVG	0.2970	0.1498	0.0121	0.9403
FS	23.616	1.2948	17.061	28.054
Country-Specific Control Variables				
GDPG	0.0220	0.0335	-0.1116	0.1959
INF	0.0245	0.0344	-0.0486	0.7230

The firm size illustrates a standard deviation of 1.29 which depicts that there is a large variation in the firm size within the sample, hence comprising of both the large and small-sized organizations with a minimum and maximum size of 17.06 and 28.05, respectively. The average leverage position of the firms in the sample is 0.297 and the standard deviation is 0.149. The minimum and maximum leverage figures range between 0.0123 and 0.9403. These variations could be associated with the

size of the organizations in the sample, as Chatterjee and Eyigungor (2022) identifies that larger firms tend to have a higher leverage as compared to the smaller sized firms.

The findings for GDP illustrate the mean to be 0.022 with a standard deviation of 0.034. Furthermore, the minimum value is – 0.111 and the maximum value is 0.195, which represent the continents of Europe and Asia, respectively. These findings are in line with Jayathilaka et al. (2022) wherein the Asian continent has a considerable GDP growth in comparison to others, as it consists of various countries that uphold a strong and steady economy although the continent experiences vulnerable economic situations. Furthermore, the inflation rates range between a minimum value of -0.0486 and a maximum of 0.7230 with a mean of 0.025 and a standard deviation of 0.034.

4.1 Results and Analysis for Model 1: ESG and Credit Ratings

4.1.1 Correlation Matrix Analysis and Discussion

Table 7 presents the correlation coefficients of all the variables involved in this research. The results of the ESG score illustrate a positive correlation of 0.147 with the firm's credit ratings at a 99% confidence interval. As proposed in the model development, this would indicate that the higher the ESG performance, the better would be the credit rating. This is in line with the previous studies administered by Kiesel and Lucke (2019), Michalski and Low (2021), and Yoo (2021). Likewise, all the individual components of ESG are observed to have a significant positive correlation with credit ratings at the 1% significance level. This is supported by the findings by Devalle et al. (2017) and Dorfleitner et al. (2020) wherein the social and governance variables were highly significant to the credit ratings, but not the environmental ratings. In contrast, the study by Attig et al. (2013) and Zanin (2022) found that the environmental factor is positively correlated with the firm's credit ratings. The results also illustrate that all three individual components of ESG are closely correlated with the credit ratings. The environmental and social scores are correlated at the 1% significance and consistent with the findings of Cubas-Diaz and Sedano (2018) who verified that the firms which perform well environmentally are also able to function well socially.

Table 7. Correlation Matrix for Model 1

Correlation Matrix											
Variables	CR	ESGS	ES	SS	GS	EBITM	CCC	FS	LVG	GDPG	INF
CR	1.00										
ESGS	0.1474***	1.00									
ES	0.1945***	0.8256***	1.00								
SS	0.0735***	0.8831***	0.7437***	1.00							
GS	0.0661***	0.6615***	0.4016***	0.4428***	1.00						
EBITM	0.1703***	-0.0512***	-0.0787***	-0.0187	-0.0683***	1.00					
CCC	-0.0709***	-0.0411***	-0.0486***	-0.0526***	-0.0076	-0.0535***	1.00				
FS	0.2812***	0.3866***	0.4554***	0.3188***	0.1858***	-0.0096	-0.0096	1.00			
LVG	-0.3032***	-0.0505***	0.0060	-0.0579***	-0.0462***	-0.0983***	-0.0173	0.0729***	1.00		
GDPG	-0.0062	-0.1456***	-0.1349***	-0.0960***	-0.0844***	0.0494***	-0.0006	-0.0724***	-0.0374***	1.00	
INF	-0.1718***	-0.0658***	0.0906***	0.0142	-0.0531***	0.0326**	0.0002	-0.1190***	0.0288**	0.3057***	1.00
Collinearity Diagnostics											
VIF		1.23	2.62	2.44	1.27	1.03	1.01	1.31	1.03	1.18	1.20
Mean VIF		1.43									

*Note: ***, **, and * show statistical significance at 1%, 5%, and 10% respectively.*

The EBIT margin is observed to have a positive correlation of 0.1703 with the credit ratings at the 1% significance level. These findings are similar to the study by (Munoz-Izquierdo et al., 2022) whereby they found profitability to be one of the strongest predictors of credit rating, and therefore, a decline in profitability would signal a lower corporate credit rating. Likewise, Cioli et al. (2023) found that firms with higher profitability are observed to be awarded higher credit ratings. Furthermore, the correlation results show that the cash conversion cycle is negatively correlated with the firm's credit rating at the 1% significance level.

Interestingly, the firm size is observed to have a positive correlation with most of the independent and control variables at a 1% significance level. For instance, the ESG has a positive correlation of 0.455 to the size of the company at a 99% confidence interval. According to Drempetic et al. (2020), the formalization and structure of ESG reporting differ among smaller and larger firms with the latter having more access to resources and sustainability management tools. Hence, larger firms tend to have a higher ESG performance score. In the case of leverage, a negative correlation of -0.303 with the credit ratings is observed at a 99% confidence interval. This would indicate that higher leverage would result in a lower rating, and vice versa. Similar results were discovered by Aktan et al. (2019) where companies with higher credit ratings tend to maintain minimal leverage as the cost of issuing equity is comparatively lower than that of issuing debt. Lastly, inflation rates have a negative correlation of -0.1718 with the credit ratings at the 1% significance level.

Multicollinearity arises when an independent or control variable in the regression model is in linear correlation with other explanatory variables (Awad et al., 2023). Weisberg (1985) states that the presence of this multicollinearity issue can be identified by analyzing the correlation factors as well as the variance inflation factors (VIF). If the VIF is between the values 5 to 10, then it is most likely that high multicollinearity exists amongst the variables (Shrestha, 2020). With reference to Table 7, all the correlation values range between -0.30 to 0.88 which indicates that the model does not have any multicollinearity problems as the values are below 0.9 (Gregorich et al., 2021). Furthermore, the VIF values range between 1.01 to 2.62 with an average VIF of 1.43; hence, this clearly indicates that multicollinearity would not be an issue in this model.

4.1.2 Ordinal-Logistic Regression Analysis and Discussion

On inputting the data into STATA and running the ordinal-logistic regression analysis, the total number of observations is 6000. Table 8 represents the ordinal logistic regression analysis with five different models, including the independent variable and control variables.

The LR χ^2 is statistically significant at the 1% level for all the models indicating that all the predictor's regression coefficients are different than zero. The McFadden's R^2 is used in this study as it fulfills the desired R^2 criteria and is based on the log-likelihoods of both the tested and the null models (Rimbaud et al., 2015). It is the explanatory power of the models which indicates how much of the dependent variable's variation can be interpreted by the independent variable (Chicco et al., 2021). This means that the independent variables and control variables in model 1 explain 24.2% of the variation in the dependent variable, i.e., the credit ratings. Since 75.8% are still unexplained factors that affect the credit ratings, further models are included to incorporate factors that will increase McFadden's R^2 . For instance, the model 2 with ESG score is observed to explain 25.8% of the variations in the credit ratings. Hence, this research uses 5 models to analyze the impact of the ESG variable and each of its components in the presence of control variables on the credit ratings to better explain the performance of firms' ratings.

It is particularly noteworthy that as per the first hypothesis (H_1) proposed in this thesis, the ESG scores are positively influencing corporate credit ratings at the 5% significance level. This is in line with the studies conducted by Chodnicka-Jaworska (2021) who identified that ESG performance and decisions of the firms have an impact on the credit ratings. Similarly, the regression analysis performed by Kim and Li (2021) found that the ESG components are statistically and economically significant to credit ratings. Furthermore, Bhattacharya and Sharma (2019) emphasizes the importance of ESG disclosure score as instrumental for good firm reputation and investor confidence; thereby, resulting in higher credit ratings. His study found that the adoption of ESG measures by firms releases signals of the firm's transparency, and compliance beyond social norms and, hence, influences the trust of CRAs. This also supports the signaling theory, whereby firms act as signalers and CRAs as receivers. Similarly, Attig et al. (2013) and Cubas-Diaz and Sedano (2018) studied the impact of ESG on long-term credit ratings using indicators developed by the MSCI ESG STATS (particularly the employee relations, community associations, product characteristics, diversity and environmental practices) and by the ASSET4 Datastream scores, respectively, to discover that credit rating agencies indeed assign higher credit ratings to

organizations that demonstrate higher ESG performances. However, the study by Srivisal et al. (2021) finds the credit ratings of Chinese firms on Shanghai Shenzhen CSI 300 to have no statistical significance to the ESG scores. This could be due to the political nature of the Chinese firms, whereby they receive tax or financial privileges which results in an enhanced firm performance but contradicts the ESG values (Ding et al., 2014). CRAs are increasingly concerned with the firms' ESG issues, which can cause a negative impact on the organization's financial position and increase the vulnerability of creditors to significant losses (Fabozzi et al., 2021). Favorable ESG performances influence an increase in the firm's credit ratings due to the borrowers' cash flow, risk of the sectors, and the likelihood of the firm's default (Chodnicka-Jaworska, 2021). According to agency theory, ESG data supports reducing information asymmetry between the firms and CRAs as it decreases information risk, resolves the dilemma of adverse selection, and moral hazard and hence, results in increased credit ratings through decreased financing costs (Cioli et al., 2023).

Table 8. Ordinal-Logistic Regression Results

Variable	Credit Rating				
	Model 1 Control Variables Only	Model 2 ESG Score	Model 3 Environmental Score	Model 4 Social Score	Model 5 Governmental Score
ESGS		0.0894**			
ES			0.0071***		
SS				0.0028***	
GS					0.0073**
CCC	-1.2209***	-0.9034***	-0.8239***	-0.9908***	-0.9587***
FS	0.5036***	0.4996***	0.4462***	0.5396***	0.5268***
LVG	-3.8424***	-3.8650***	-3.8484***	-3.9294***	-3.9054***
EBITM	1.9056***	2.1603***	2.2520***	2.1251***	2.1104***
GDPG	2.6271***	3.6282***	4.1078***	3.0102***	3.2825***
INF	-11.7903***	-15.9375***	-16.0837***	-15.5098***	-15.8642***
SEC	-0.0592***	-0.5513***	-0.0579***	-0.0524***	-0.5422***
CTRY	-0.0023	-0.0026	-0.0008	-0.0040	-0.0039
LR χ^2	1703.20***	1746.54***	1791.51***	1745.92***	1754.33***
McFadden's R-squared	0.242	0.258	0.264	0.257	0.258

Note: ***, **, and * show statistical significance at 1%, 5%, and 10% respectively.

Furthermore, the results of the ordinal-logistic model show that each of the ESG pillars, i.e. the environmental and social scores, has a significant positive influence on the credit ratings at the 1% level, whereas the governance score has a positive significance at the 5% level, proving hypotheses H_{1a}, H_{1b} and H_{1c}. Zanin (2022) found that the environmental pillar score significantly enhances the firm's credit ratings across all the sectors, particularly in the quarrying and mining sectors. As a result, organizations with better environmental performance are considered to be more resilient towards long-term risks and therefore be more appraised by the CRAs. Similarly, Stellner et al. (2015) and Jang et al. (2020) identified that higher environmental performance results in lowering the issuer's cost of debt financing and higher bond returns, in addition to a higher credit rating, especially in smaller firms. According to Yang's (2020) findings, environmental and social performance result in higher credit ratings as compared to the corporate governance. However, Devalle et al. (2017) found that the social and governance pillars had a significant influence on the credit ratings whereas, the environmental pillar was comparatively weaker. The environmental pillar's insignificance may be due to the small sample size of only one year for the Italian and Spanish public firms. Furthermore, the study by Sareen and Vij (2014) on Indian firms found consistent results with previous studies, indicating that corporate governance positively influences credit ratings. This is because an inefficiency in governance will have a negative impact on the organization's financial position, exposing stakeholders to potential losses.

Despite the interesting relationship between ESG and corporate credit ratings, this model also found significant associations with the firm-specific control variables. The results remarkably illustrate that the EBIT Margin is positively associated with credit ratings at the 1% significance level in all the models which support our hypothesis (H₂). This could be due to the ability of the firm to generate profits which decreases the firm's default risk and, in turn, improves credit ratings (Attig et al., 2013). Similarly, the study by Xia (2014) finds that the firms with higher profitability, which measures their debt repayment ability, are more likely to receive a favorable rating, whereas firms with higher profitability volatility, which essentially captures the uncertainty in firms' debt repayment ability, are associated with a lower rating. According to the study by Cioli et al. (2023) on the sample of US-listed firms, the profitability ratios were positive and significant to the credit ratings, whereby, firms that are more profitable tend to be assigned higher credit ratings. This is line with the research by Chodnicka-Jaworska (2022) who evaluated the impact of profitability on the credit ratings in the energy sector using the EBITDA margin, which measures a firm's operating

profit as a percentage of its revenue. A strong association was identified wherein a rise in the firm's profitability caused an increase in the credit ratings, especially when measured by the Fitch rating agency. The CRAs indicate that the changes in ratings can be caused by the fundamental transitions in the organization's credit risk, such as the introduction of modern technology or competition which could impact the firms' projected future profitability and hence, prompt a change in the credit ratings assigned to the firm (Alissa et al., 2013). Furthermore, the comprehensive research in Brazil conducted by Murcia et al. (2014) discovered that the substantial determinants of credit ratings include profitability, internationalization, leverage, financial market performance, and growth. Similarly, the study by Gupta (2021) on Indian firms and the CRAs in India discovered that both the cross-sectional and panel data approaches illustrate profitability to be significantly associated with the firm's credit ratings.

It is interesting to note that the Cash Conversion Cycle is negatively associated with the credit ratings at the 1% significance level in all the models. This supports our hypothesis (H₃) which is similar to the findings by Kerem and Sargon (2021) whereby higher credit ratings have an inverse impact on CCC, resulting in shorter cash conversion cycles, and firms under continuous monitoring of the CRAs may choose to adopt conservative liquidity management strategies to improve their profitability. As CCC is considered the standard measurement for the working capital management, firm's attempt to improve profitability by reducing the days related to the inventory accounts and accounts receivables as well as by increasing the accounts payable days (Kerem and Sargon, 2021). On the other hand, Abuhommous et al. (2022) explains the concave relationship between the working capital management and credit ratings wherein investments in working capital can be favorable for achieving greater credit ratings. This is due to its capability to decrease the firm's risks and lead to an enhanced operating performance through a reduction in the inventory and CCC. However, an excessive investment after a point can cause a decline in credit ratings due to the negative influence on the firm's operating performance, cash inflows and their inability to repay interest payments. Furthermore, the study identifies that an increased investment in the accounts receivable and inventory could result in a greater credit rating, whereas an increase in the accounts payable could cause a lower credit rating. Similarly, Flannery and Oztekin (2019) explores the impact of the individual components of the CCC i.e., the inventory, receivables, and payables on the credit ratings. It was identified that an increase in receivables and inventory increases an organization's credit rating, whereas an increase in the payables leads to a decreased credit rating

due to the associated risks in the firm's higher leverage and potential of debt-related bankruptcy. An efficient working capital management reduces the firm's risk of inability to meet short-term obligations, hence reducing its default risk and loss of reputation. It is of utmost importance for the managers to understand the relationship and impact of working capital management on credit ratings in order to procure external financing, particularly since the 2008 financial crisis (Abuhommous et al., 2022). Hence a decrease in the cash conversion cycle days can influence an increase in the credit ratings.

The results also confirm hypothesis (H₄) that the firm size has a highly positive significance to the credit ratings at the 1% level, which indicates that larger companies tend to receive higher credit ratings. Tarigan and Amarullah (2017) also found a significant positive impact of firm size on the credit rating, assigning higher ratings to larger organizations. This could be due to the ease with which large firms can secure loans from creditors, as they are considered to have lower default risk and be able to compete and survive within the industry. Another possibility is that the smaller firms have only limited resources for the CRAs to conduct an evaluation of the firm's overall aspects, as well as the challenge of these small firms on the cost of maintaining high ratings (Jang et al., 2020). Furthermore, large-sized firms usually dominate the market and thereby achieve above the average profit rates. Such firms also have greater access to resources for risk diversification which presents a decreased risk to the investors, thereby resulting in higher credit ratings (Gupta, 2021). The size of the firm and market capitalization has also been associated with the quality and depth of information released by firms which thereby impacts the firm's credit ratings (Gupta and Motwan, 2022). Larger organizations are generally assigned "AA" ratings and above because of their financial stability whereas, the smaller to medium sized firms signal their creditworthiness using ESG performances and disclosures (Bhattacharya and Sharma, 2019). Furthermore, the study by Lin (2020) identified that larger firms with sound corporate governance practices were observed to gain higher credit ratings. Due to the tendency of larger firms to have reduced asymmetric information released in the market, they are assigned a higher credit rating by the CRAs (Abuhommous et al., 2022). Likewise, Rafay et al. (2018) analyzed 50 organizations listed in the Taiwan Stock Exchange (TSE) over the years 2010 to 2015 and the results identified a positive association between credit ratings and firm size. These conclusions reinforce the signaling theory whereby larger organizations most often have a more significant predicted future cash flows, and

enhanced capability to withstand financial distress and insolvency. Hence, firms with larger sizes are awarded higher credit ratings.

The findings also show a negative coefficient and high significance at the 1% level for the leverage variable across all five models, suggesting that firms with high debt ratios typically have lower credit ratings, hence confirming hypothesis (H₅). This is consistent with Abuhomous et al.'s (2022) findings that leverage is inversely proportional to credit ratings, as highly leveraged companies are more likely to suffer from financial catastrophes and the likelihood of bankruptcy. Similarly, Gupta (2021) and Chodnicka-Jaworski (2021) identified that firms with high leverage tend to have significantly decreased credit ratings from the major CRAs, namely the S&P, Moody's, and Fitch. This is due to the high indebtedness position caused by increased leverage which indicates that the company is at risk, and hence, creating a negative but significant impact on the credit ratings (Gupta, 2021). The firm's credit rating acts as a signal regarding its quality, which impacts on its cost of capital, wherein, a credit downgrade could cause significant costs, loss of potential contracts, and variations in the coupon rate. Consequently, the inherent linkage between the credit ratings and leverage urges managers to implement capital structure decisions which reduces their leverage ratio during credit rating downgrades (Joo and Parhizgari, 2021). According to Driss (2021), agency conflicts are also a critical determinant of capital structure decisions, with debts acting as a disciplinary tool for managers by minimizing free cash flow and probable cash diversion, as well as subjecting them to increased stringency of credit monitoring. The study by Wojewodzka, et al. (2018) identified a negative association between the credit ratings and leverage ratios whereby firms with higher credit ratings adopt a more conservative approach to debt financing and issues more of equity financing, and hence, maintaining reduced leverage ratio and higher credit ratings.

As for the country-specific control variables, the results support hypothesis (H₆) whereby the impact of GDP on the corporate credit ratings were found to be positive and statistically significant at the 1% level in all the five models. Hence, a healthy and growing economy is expected to influence reduced default risks and a decreased overall likelihood of downgrades in ratings, and vice versa (Jones et al., 2015). However, this result contradicts the findings by Figlewski et al. (2012) using the semi-parametric Cox regression model, wherein the real GDP growth was highly significant but with a negative association to the credit ratings, which could be due to their assumption that a growing economy makes it challenging for CRAs to differentiate the creditworthiness among firms.

According to Chodnicka-Jaworska (2022) the default probability of the firms in the oil and gas sectors are observed to be lower in developed countries. Furthermore, they found that GDP had a positive influence on the credit ratings, hence developing a spiral effect. Consistent results were also found in the financial industry by Chodnicka-Jaworska (2017) on the banks' credit rating published by Moody's and S&P, evidencing that GDP is positively related to the credit ratings.

The results of all the five models confirm the hypothesis (H₇), whereby the increase in inflation rate is observed to have a negative association with credit ratings at the 1% significance level Mamilla et al. (2019) found similar inferences among Indian firms identifying that firms, in countries with lower inflation rates experienced favorable credit ratings. Moreover, Driss et al. (2021) analyzed a comprehensive set of organizations from 57 countries using OLS and Ordered probit regression frameworks and observed consistent results with the current findings. These findings are also in line with the empirical results by Kaur et al. (2023) who identified inflation to be one of the macroeconomic variables having a negative association with credit ratings. The inflation rate negatively impacts the corporate credit ratings due to the surge in the cost of raising capital resulting in higher repayment risks. The elevated inflation can also cause an increase in systemic risks, higher financial costs, and reduced accessibility to financial resources, which eventually impacts the credit ratings negatively (Karminsky and Polozov, 2016).

The results also reveal that the GICS sector is statistically significant across all five models at the 1% significance level, unlike the country, which had no statistical impact on corporate credit ratings. A greater impact of ESF measures on credit ratings was observed in sectors such as industrial, energy, materials, and utility. The sample in this thesis includes these sectors, suggesting that they can enhance the association between ESG and credit ratings. Furthermore, the study conducted by Chodnicka-Jaworska (2022) demonstrated that the sector-specific impact of ESG pillars on credit ratings varies. For instance, the environmental scores in the oil and gas industry significantly influenced Moody's credit rating, while the social factor in the coal industry had a greater impact. Finally, table 9 summarizes the regression results of model 1.

Table 9. Summary of Results for Model 1
Impact of ESG on Credit Ratings

Expected Hypothesis	Results	Supporting Studies	Consistent with Theory
H1: The firm's ESG score is positively associated with CR	Accepted at the 5% significance level.	Chodnicka-Jaworska (2021) Kim and Li (2021) Bhattacharya and Sharma (2019)	Signaling theory and Legitimacy theory
H1a: The firm's Environmental score is positively associated with CR	Accepted at the 1% significance level.	Zanin (2022) Jang et al. (2020)	Signaling theory
H1b: The firm's Social score is positively associated with CR	Accepted at the 1% significance level.	Devalle et al. (2017) Yang (2020)	Signaling theory
H1c: The firm's Governmental score is positively associated with CR	Accepted at the 5% significance level.	Devalle et al. (2017) Sareen and Vij (2014)	Agency theory
H2: The firm's EBIT Margin is positively associated with CR	Accepted at the 1% significance level.	Xia (2014) Cioli et al. (2023)	Signaling theory
H3: The firm's Cash Conversion Cycle is negatively associated with CR	Accepted at the 1% significance level.	Flannery and Oztekin (2019) Kerem and Sargon (2021)	Signaling theory
H4: The firm's size is positively associated with CR	Accepted at the 1% significance level.	Tarigan and Amarullah (2017) Abuhommous et al. (2022)	Information Asymmetry theory
H5: The firm's leverage is negatively associated with CR	Accepted at the 1% significance level.	Abuhommous et al. (2022) Chodnicka-Jaworski (2021)	Agency theory
H6: The country's GDP growth is positively associated with CR	Accepted at the 1% significance level.	Jones et al. (2015) Chodnicka-Jaworska (2017)	Signaling theory
H7: The country's inflation is negatively associated with CR	Accepted at the 1% significance level.	Mamilla et al. (2019) Kaur et al. (2023)	Signaling theory

4.1.3 Robustness Test

Table 10 presents the results of further analyses conducted to evaluate the robustness of the findings over different sample periods. The robustness of the main findings was examined over a set of three five-year subsample periods. Consistent with the earlier findings in this thesis, the estimated coefficient on the ESG score has a positive and significant impact on firms' credit ratings across the various subsample periods considered.

Table 10. Ordinal-Logistic Regression Sub-Sample Results

Variable	CR		
	2008-2012	2013-2017	2018-2022
ESGS	0.0847*	0.0900**	0.0910**
CCC	-1.0668***	-0.8945***	-0.8988***
FS	0.4923***	0.4971***	0.4984***
LVG	-3.7698***	-3.8420***	-3.8525***
EBITM	2.1945***	2.1754***	2.1682***
GDPG	3.5797***	3.6306***	3.6228***
INF	-16.3296***	-16.0589***	-15.9761***
SEC	-0.0508***	-0.0532***	-0.0543***
CTRY	-0.0007	-0.0020	-0.0024
LR	1684.86***	1731.40***	1740.39***
McFadden's R-squared	0.214	0.237	0.241

Note: ***, **, and * show statistical significance at 1%, 5%, and 10% respectively.

4.2 Results and Analysis for Model 2: Credit Ratings and Share Price

4.2.1 Correlation Analysis and Discussion

Table 11 presents the results of Pearson's correlation matrix for all the dependent, independent and control variables in Model 2. The results indicate that a strong positive correlation of 0.190 exists between credit ratings and share price at the 1% significance level. This is in line with the findings by Rafay et al. (2018) wherein the stock price depicted highest positive correlation with credit ratings. This is also corroborated with the study administered by Lim and Mali (2024) who found Tobin's Q to increase with the firm's credit ratings. They have however also identified that while the firm's share prices lead to better credit ratings, this relationship tends to be inverted above a

particular threshold level as a result of the firm's overvaluation leading to incorrect default risk assessments.

The ESG score results posit a significant positive correlation of 0.349 with the firm's share prices at a 99% confidence interval, which indicates that higher the ESG performance, the better would be the firm's share price. This result aligns with the studies conducted by Broadstock et al. (2021), Kulal et al. (2023) and Shakil (2020). Furthermore, the correlation matrix also indicates that the individual components of ESG, i.e., the Environment and Social scores have a positive correlation with share prices at the 1% significance level, whereas the Governance score shows insignificant results in the correlation. Similarly, Albuquerque et al. (2020) conducted a study wherein the Environmental and Social components of ESG were observed to have high positive significance with share prices, especially with prices performing better amongst firms with high ES scores. Conversely, the findings by Al-Hiyari and Kolsi (2021) on the MENA region illustrate that social and governance scores were significantly correlated to the share prices but the environment score was insignificant, which suggests that the market price is impacted by responsible practices that provide valuable and beneficial information to the investors. The correlation results for the EBIT margin however show negative and insignificant to the firm's share prices.

A negative correlation of -0.0476 at a 1% significance level is observed between the firm's leverage and the share price, which indicates that a higher leverage will lead to lower price per share, which aligns with the findings by Rafay et al. (2018). Similarly, PeiZhi and Ramzan (2020) identified a negative correlation with share prices suggesting that the companies that have taken on more risks create a concern in the entire market due to the opinion that the financial crisis 2008 was majorly caused by the substantial usage of debt financing. Meanwhile, the correlation matrix depicts a positive correlation of 0.2782 at a 99% confidence interval between the firm's size and its share prices, which support the conclusions derived by Nazir (2022) that an increase in the firm size positively influences its share prices.

The correlation results reveal that there exists a negative correlation of -0.2520 at the significance level of 1% between the country's GDP and share prices, which supports the results by Zhou et al. (2022) that GDP growth causes a negative influence on the firm's value. Furthermore, inflation is observed to have a negative correlation with the firm's share prices at the 1% significance level. This is consistent with the study by Zhang (2021) that an increase in inflation which causes an elevation in the marginal wealth value is considered as bad news for the investors and are negatively associated with stock returns which thereby reduces the firm's share prices.

As evident in the correlation matrix, the values range between -0.2520 and +0.9055 which illustrates that the study does not contain any multicollinearity problems since the correlation figures are below 0.9 (Gregorich et al. 2021). Additionally, the mean VIF value is 1.487 which implies that there is no cause for multicollinearity concerns amongst the variables (Field, 2013).

4.2.2 Panel Regression Analysis and Discussion

The Hausman test is used to determine whether the random effects or fixed effects model is more suitable (Hausman et al., 1984; Lord et al., 2021). Adhering to the results of the Hausman Test χ^2 in Table 12 which illustrates strong statistical significance at the 1% level, the fixed effect model is preferred whereas, the random effects model is rejected (Awad et al., 2023). The R^2 in empirical studies is the explanatory power popularly used as a measure of goodness-of-fit to evaluate regression analysis models due to its informativeness, truthfulness and reduction in uncertainty (Ozili, 2023). This indicates that the independent variables and control variables in column 2 explain 27% of the variation in the dependent variable, i.e., the share price. Furthermore, this model explains 26% of the variation in the moderation impact of the ESG score and each of its pillars between the firm's credit ratings and share prices. Additionally, the F-statistics of the fixed effects model verifies that the regression model is highly significant (p-value < 0.01) and empirically proven as all coefficients are different than zero (Awad et al., 2023).

The results of the regression analysis confirm the hypothesis (H_1), which predicts a positive association between the credit ratings and firm's share price, is accepted at 0.0912 at a 1% significance level. This indicates that firms with higher credit ratings tend to have a greater share price. This finding aligns with the results drawn by Ng and Ariff (2019), which found that the investors react to the new credit rating announcements which causes a surge in stock prices, especially during affirmation ratings as it is an indicator that the firm has maintained their positive rating. Furthermore, the study by Reddy et al. (2019) suggest that the market has become highly sensitive to the credit ratings announcements by particular CRAs. Specifically, it was observed that prices are significantly impacted during Moody's announcements of downgrade rating as compared to the upgrade rating which implies that investors consider this announcement as new and essential data, and hence react accordingly. In accordance with the signaling theory, the organizations with green commitment deliver credible signals to the investors of practicing environmental responsibility resulting in greater reputation, higher credit ratings and lower stock price crash risk

(Liu et al., 2022). Hence, the results of the regression analysis suggest that a change in the credit rating would release relevant new data into the market which causes a stock price reaction (Baraccat et al., 2020). However, studies by Reddy et al. (2019) and Baraccat et al. (2020) also observe a significant market reaction during credit rating downgrades as compared to the upgrades. Whereas Ryu et al. (2019) finds significantly positive (negative) investor sentiments to credit rating upgrades (downgrades). According to Krishnan et al. (2020), post the global financial crisis period, the reaction of investors in the Indian markets, although minimal, has shown increased sensitivity towards credit rating downgrades compared to the upgrades. This indicates that credit ratings reveal valuable information to the market that impacts the share prices. Furthermore, the study by Mokoaleli-Mokoteli (2019) also found that the share prices had a negative reaction to credit rating downgrades with significant movements taking place before and after the announcements. This indicates that the market reacts to the credit rating downgrade due to the release of new relevant information, however, it could also cause a severe disinvestment from the economy.

Table 12. Panel Regression Results

Variable	Log(SP)					
	Control Variables	Credit Rating	CR*ESGS	CR*ES	CR*SS	CR*GS
CR		0.0912***	0.0463***	0.0687***	0.0533***	0.0680***
ESGS			0.0078***			
ES				0.0037**		
SS					0.0068***	
GS						0.0038***
CR*ESG			0.0007***			
CR*ES				0.0003***		
CR*SS					0.0006***	
CR*GS						0.0003***
EBITM	0.3520***	0.2638***	0.2858***	0.2884***	0.2812***	0.2931***
LVG	-0.8092***	-0.4930***	-0.4957***	-0.5068***	-0.4938***	-0.5039***
FS	0.5155***	0.4907***	0.4610***	0.4742***	0.4563***	0.4886***
GDPG	-0.6178***	-0.6627***	-0.6328***	-0.6218***	-0.6097***	-0.6074***
INF	-3.2718***	-3.4537***	-4.7507***	-4.7427	-4.7862***	-4.6919***
Constant	-9.647***	-10.3370***	-9.1091***	-9.6438***	-9.0771***	-9.9489***
F-statistics	325.74***	328.03***	232.15***	227.58***	231.68***	226.85***
R-squared	0.2351	0.2709	0.2676	0.2637	0.2672	0.2625
Hausman Test (χ^2)	411.57***	58.70***	88.51***	13.68**	13.53*	37.42***

Note: ***, **, and * show statistical significance at 1%, 5%, and 10% respectively.

Model 2 equations 3 to 6 aimed to test the moderation effect of ESG between corporate credit ratings and share price. With reference to hypothesis (H₂), we expect ESG to be moderating the relationship between credit ratings and the share price. The results in Table 12 confirm that a better credit rating will positively influence the share price when the ESG score is high. Hence, the firm's overall ESG score strengthens the relationship between corporate credit ratings and the firm's share price at the 1% significance level. Similarly, the hypotheses (H_{2a}), (H_{2b}), and (H_{2c}) which expect the environment, social, and governance scores respectively to moderate the relationship between credit rating and the share price is confirmed by the results from panel regression. The (H_{2a}) is positively significant at the 5% significance level while (H_{2b}) and (H_{2c}) are significant at the 1% significance level. This indicates that a higher credit rating will positively influence the share price when each of the ESG pillars' score is high. Hence, the ESG's three pillars strengthen the relationship between the corporate credit ratings and the firm's share price. The only other study which sought to examine the moderating influence of behavioral biases of investor choices related to ESG in stock valuation is Leite and Uysal (2023). They utilized an event-study methodology to identify that the stock's price reaction tends to be positively moderated during credit rating changes for the firms perceived by investors as having attractive ESG attributes, whereas investors tend to underreact to credit rating upgrades and overreact to credit rating downgrades for firms with lower ESG attributes. This implies that the ESG performances can impact the extent to which share prices react to variations in the credit ratings. However, unlike this thesis study, they have not found any statistically significant evidence of the association between the ESG pillars and share prices.

The findings indicate that the ESG scores positively impact share prices, which aligns with the results by Ray and Goel (2023) that there exists a long-term positive relationship between ESG performances and share prices of listed organizations in developing economies. The Merrill Lynch 2019 report identified that organizations with ESG reporting systems experienced a greater year to year returns which results in higher performing stocks, lower declines in stock prices and reduced probability of bankruptcy (Bhatti and Sulaiman, 2021). Likewise, this is consistent with the results by Grewal et al. (2021) wherein organizations that practice more sustainability disclosures under the SASB is shown to experience greater stock price informativeness which indicates that these disclosures consist of financially linked firm-specific data. Furthermore, Darolles et al. (2023) used the causal mediation analysis to establish that the data contained in the firm's overall ESG, and its components E, S and G are effectively integrated into the share prices through the investor demand

channel as the institutional investors are observed to be highly sensitive to ESG information, which thereby impacts the share prices. Moreover, firms which are engaged in more ESG-related activities tend to experience a reduced probability of stock price crash risk due to the lowered information asymmetry and enhanced firm reputation among the investors (Bae et al., 2021). The research by Xu et al. (2023) further investigated the impact of ESG performances on share price resilience during the pandemic crisis and discovered that firms with higher ESG scores experienced greater stock price resilience and higher stock return, hence positively acting as an equity vaccine. Their research indicates that firms undertaking ESG responsibilities are able to mitigate the impact during crisis and aid in stock price recovery during the post-crisis period, which is consistent with the findings by Albuquerque et al. (2020). The findings obtained can also be corroborated by the theoretical underpinning studied in section 2.3. A divulgence into the significance of ESG initiatives by organizations reinforces its social proclivity, and therefore bridges the legitimacy gap between the organization and the society (Bamahros et al., 2022). The organization is rewarded through a reflection in their share price value, which indicates that a positive long-run relationship is established between the organization's ESG disclosure and its share price (Ray and Goel, 2023). This relationship amongst the principal (investors) and the agent (management) decreases information asymmetry by reducing the knowledge barrier, and investors tend to illustrate a preference for high ESG scores which provides a favorable signal to the stock market and improves the firm's value (Kim et al., 2014; Lourenco et al., 2013).

Furthermore, the results of the panel regression model also confirm the positive relationship between each of the firm's ESG scores, i.e., the environment, social and governance scores and its share prices. This is supported by the findings of Albuquerque et al. (2020) wherein firms with higher environmental and social scores experience much better share prices especially during periods of crisis due to the investor loyalty towards ES practicing firms. The impact of environmental score on share price can result from the prioritization by sustainable investors on environmental concerns and the tendency to overweight assets with the highest environmental score and underweight assets with the lowest environmental score. This environmental integration causes imbalances in the supply and demand of sustainable assets which consequently impact the share prices (Zerbib, 2022). Similarly, Tommaso and Mazzuca (2023) studied the impact of ESG rating upgrades and downgrades on the stock market prices of insurance companies in Europe to realize that investors reacted strongly to a downgrade in environmental score as compared to the social and

governance components, causing a drop in the share prices. The empirical study by Miralles-Quiros et al. (2018) on the Brazilian firms found that the market values ESG practices based on the industry, as environmental scores were found to be positive and significant in the non-environmentally sensitive industries, while the social and governmental scores were significantly positive to share prices in the environmentally sensitive industries. Similarly, the sample in this thesis research consists of 10 industries and the results of the regression model clearly indicate that all the ESG components have an impact on the firm's share price. The positive association between corporate governance and share prices is consistent with the results by Ng and Rezaee (2020) wherein the governance performance component has the highest influence on SPI, explained by the investors interest in corporate governance factors which are directly related to shareholders benefits. This suggests that investors tend to believe that the organizations that have strong corporate governance practices and are effectively managed tend to be more sustainable in the long term. Furthermore, Luo et al. (2023) identified corporate governance to play the most prominent role in the alleviation of stock price crash risk.

The results of the panel regression depict a positive association between EBIT margin and share price at the 1% significance level which confirms the hypothesis (H_3) that a higher profitability margin will positively influence the firm's share price. Similarly, the results by Sholichah et al. (2021) identified that the firm's profitability has a direct and significant positive association with share prices due to its role as a desirable signal to the investors. Hence, the firm's profitability impacts its value as it provides an indication of an increase in its internal sources and prospective of future opportunities which is considered desirable in the sight of the investors (Munfaqiroh et al., 2023). According to the study by Sudiyatno et al. (2020) on the Indonesian stock exchange listed manufacturing firms, the firms' profitability was found to be significant to the stock price whereby, higher profitability resulted in higher firm value. Therefore, when the firm's profitability is an indication of its performance, the market responds favorably wherein the investors are willing to purchase the firm's shares with expectations to receive higher returns from their investments. Furthermore, the study by Albart (2023) found a positive significant impact between the net profit margin and the share price, which was associated with the investors' interest towards firms with healthy profit margins as it is a reflection of its efficient cost management, robust profitability and the ability to produce substantial profits. The increase in profit margin is also reported to positively influence an increase in stock returns as highlighted by Anwaar (2016) which was associated with

the firm's ability to retain more cash and increased return on asset which would subsequently result in higher stock returns. In accordance with the signaling theory, Yuliza (2018) identified that the firm's profitability provides a positive signal to the investors and has increasingly become an essential consideration in decision-making, which in turn impacts the share prices.

The results reveal that the firm size has a positive impact on its share prices at the 1% significance level which is in accordance with the study by Yuliza (2018) and Sitorus et al. (2021). This confirms the hypothesis (H₄) that a greater firm size will positively influence the firm's share price. The growing large-scale firms that have increasing profitability will tend to be a pull factor that creates investor interest in the firm's shares. Hence, the firm size serves as an indicator for the level of risk, and large firms are associated with having better financial capacity, capable of meeting their commitments and accommodating adequate returns for the investors (Ispriyahadi and Abdulah, 2021). The regression results are similar to the study by Fathinah (2021) wherein the firm size has a significant positive influence on the share price, which could be due to the larger size being an indication that the firm has collateral that minimizes bankruptcy risk. Hence, investors tend to be attracted to purchase shares in these firms and this demand results in an increase in their share prices. Likewise, the study conducted by Murniati (2016) on the Food and Beverage firms in the Indonesia Stock Exchange found that the larger the firm size in terms of total assets, the higher is the share price due to its ability to attract investors in the capital market. As compared to the smaller firms, these large companies are able to more easily acquire loans pledging their higher assets value as collateral and earning the bank's trust which helps to increase their share price. Furthermore, Wu and Hu (2019) identified that firm size is negatively associated with the stock price crash risk which indicates that the larger an organization's size, the lower would be the probability of a stock price crash. The findings of this analysis are in line with the results drawn by Dang et al. (2019) which found that the firm size has a significant positive impact on share price measured by Tobin's Q, and it contradicts the research conducted by Marc et al. (2022) which concluded that the firm size has no impact on its share price, which could be due to their smaller sample size in the dataset.

The hypothesis (H₅) which expects negative relationship between leverage and share price is confirmed empirically at the 1% significance level, which is consistent with the results by Ibrahim and Isiaka (2020) and Lestari et al. (2020) which found that an increase in the firm's leverage causes a decrease in the firm value. Similarly the study by Iqbal et al. (2016) on the Cement industries in

the Pakistan Stock Exchange identified that while the firm size is positively impacting the share price, the leverage ratio is negatively associated with the share price at less than five percent significance, which suggested that higher debt was seen as not beneficial to the shares' market value. The findings by Albart et al. (2023) also illustrate a rather significant negative impact of debt ratio on share prices as a higher debt ratio concerns investors regarding the firm's financial leverage and the possible risks linked with debt liabilities, and therefore this elevated investor apprehension can result in reduced share prices. This is also explained by the structure framework generated by Merton (1974) wherein the distance-to-default diminishes when there is an increase in leverage which subsequently results in a higher default probability. For instance, the liquidity crisis during the 2015 stock disaster was a result of the capital leverage sparked a stock market stampede, which led to 16 limit falls for 1000 stocks in six months and bringing major panic amongst both regulators and investors (He et al., 2022). In the presence of information asymmetry between the firm and the investors, the firm's cost of external financing increases, which impacts the firm's leverage and capital structure (Jin et al., 2020). Increased leverage is often perceived by investors as indicative of inflated degree of risk within the firm and subsequently, shares of companies with higher leverage faces declining pressure on prices (Jitmaneeroj, 2024).

The hypothesis (H₆) which expects a negative impact of GDP growth on the corporate credit ratings is confirmed by the empirical results of the panel regression at the 1% significance level, which is consistent with the study by Suhail et al. (2018). Similar results were drawn in the research by Innocent et al. (2018) that GDP growth has significant negative impact on the stock market performance, and it accounts for a significant portion of the shocks in market capitalization. Ideally, according to the efficient-market hypothesis theory, a frictionless market would be one where share prices are able to completely and immediately reflect all available information. However, the study by Funashima et al. (2020) illustrates that share prices are often comparatively insensitive to the initial GDP announcement, whereas the revisions to GDP tends to cause market turmoil with varying over and under reactions, especially with negative reactions in stock prices during the first revisions in private consumption data. Furthermore, Ahmad et al. (2020) used the proxy EV/EBITDA, which is the economic measure of the firm's real market value, to conclude that GDP growth negatively impacts the value of firms listed in Nigeria. This was associated with the increased economic volatility in the country's GDP growth resulting in hinderance to firm's

operations, future earnings, and firm value. Conversely, other scholars such as Alexius and Spang (2018) and Dianita et al. (2020) have identified a positive relationship between the GDP and firms share price.

The results support hypothesis (H_7) that the inflation rate is negative and statistically significant to the share price at the 1% significance level which is consistent with the results drawn by Bhattarai (2018) that found the inflation rate to have an inverse relationship with the firm share price. The study by Prastyo et al. (2021) found similar results where the stock returns of mining firms listed on the Indonesian Stock Exchange (IDX) reduced with the increase in inflation, and vice versa. Similarly, Adekunle and Agbadudu (2015) examined the aspects influencing share prices of insurance firms in Nigeria and the results of panel data multiple regression clearly indicated that the share prices were significantly influenced by the inflation rates. Interestingly, the research by Verma and Bansal (2021) found the stock market of most developed and developing nations having a negative relation with the inflation rate due to the diminished purchasing power, lowered investment, and higher cost of living. However, they have also found the shares in very few countries such as Egypt and Pakistan to have a positive association to inflation, which could be due to investors expectation of an increase in the firm's earnings and dividends caused by increased demand during inflation in these nations. Predominantly, it is corroborated in the studies by Isma et al. (2023), Lopez (2018) and Zhang (2021) that inflation has a negative impact on share prices by transmitting a negative signal to the investors due to the information asymmetry in the market, deteriorated economic activity, and reduced stock investment. Hence, the share prices fall when the inflation rate rises. Finally, table 13 summarizes the regression results of model 2.

Table 13. Summary of Results for Model 2

Moderating role of ESG between Credit Ratings and Share Price

Expected Hypothesis	Results	Supporting Studies	Consistent with Theory
H1: Credit ratings are positively associated with the firm's SP	Accepted at the 1% significance level.	Krishnan et al. (2020) Liu et al. (2022)	Signaling and Market Efficiency theory
H2: The ESG score moderates the relationship between credit ratings and share price	Accepted at the 1% significance level.	Leite and Uysal (2023)	Signaling theory Legitimacy Theory
H2a: The Environmental score moderates the relationship between credit ratings and share price	Accepted at the 1% significance level.	Zerbib (2022)	Signaling theory
H2b: The Social score moderates the relationship between credit ratings and share price	Accepted at the 1% significance level.	Albuquerque et al. (2020)	Signaling theory
H2c: The Governance score moderates the relationship between credit ratings and SP	Accepted at the 1% significance level.	Ng and Rezaee (2020)	Signaling theory
H3: The firm's EBIT Margin is positively associated with share price	Accepted at the 1% significance level.	Sholichah et al. (2021) Albart (2023)	Signaling theory
H4: The firm's size is positively associated with share price	Accepted at the 1% significance level.	Sitorus et al. (2021) Fathinah et al. (2021)	Signaling theory
H5: The firm's leverage is negatively associated with share price	Accepted at the 1% significance level.	Jitmaneeroj (2024) Ibrahim and Isiaka (2020)	Information Asymmetry
H6: The GDP growth is negatively associated with share price	Accepted at the 1% significance level.	Funashima et al. (2020) Innocent et al. (2018)	-
H7: Inflation is negatively associated with share price	Accepted at the 1% significance level.	Lopez (2018) Zhang (2021)	-

Chapter Five

Conclusion, Limitations, and Implications

5.0 Structure of Thesis Conclusion

This chapter will provide a comprehensive view of the thesis outcomes and their impact in the discipline of contemporary sustainable finance and investment. It will further summarize the undertaken methodology, sample, variables, and key findings from the empirical evidence obtained from both the models that studies the relationship between ESG score and corporate credit ratings as well as its moderating role in strengthening the relationship between credit ratings and share price. This section will further discuss the limitations of the study and recommend areas for future research. Finally, it highlights the practical and social implication of this thesis which reiterates the significance of these findings.

5.1 Conclusion

The recent years have witnessed a substantial surge in the commitment of institutional investors and credit rating agencies towards responsible investment. This evolution is apparent by the increase in the number of global signatories and asset owners that have pledged responsible investment under the UN PRI, which expanded from 63 signatories and 32 asset owners in 2006 to a massive 3,826 signatories and 609 asset owners, with \$121.3 trillion under AUM in 2021 (Kraussl et al., 2023).

With this radical shift to ESG investments, the main purpose of this thesis is to investigate the relationship between ESG scores and the significant metrics of the firm. The research objectives include firstly, analyzing the impact of the overall ESG score in addition to the standalone E, S, and G pillars on corporate credit ratings. Secondly, investigating the impact of corporate credit ratings on share price and finally, the study determines the moderating role of ESG in strengthening the relationship between credit ratings and share price, on a global scale.

With the substantial shift in the evolution of ESG practices, this study is of paramount importance to the managers, investors, policymakers, and other stakeholders in the community. Although there are prior studies examining the relationship between ESG and its impact on firm's performance, there is minimality in the strong empirical evidence with regards to its influence on credit ratings

and share price (Rahman and Alsayegh, 2021; Xu et al., 2022). Hence, the findings of this research are expected to enrich the literature on ESG, credit ratings and share price by closing the knowledge-gap and providing significant insights to organizational leaders and critical stakeholders to make informed decisions.

Chapter Four in this thesis initially examines the impact of the overall ESG score and its pillars on the corporate credit ratings. The stratified sampling is used to distribute the sample geographically and by sector, comprising of 400 non-financial firms from Asia, Europe, the Americas, and Oceania. A panel dataset is extracted from the LSEG Data and Analytics platform and the World Bank website for the period 2008-2022. Ordinal-logistic regression is used to study the impact of ESG performance on corporate credit ratings. This is justified by the nature of the dependent variable, which is a categorical variable with an ordinal ranking. The credit ratings of this study were extracted from Moody's rating agency. The independent and control variables used were the ESG overall score, environmental score, social score, governmental score, cash conversion cycle, firm size, leverage, EBIT margin, GDP growth, and inflation rate.

The empirical results reveal that the overall ESG score, in addition to the standalone pillars, i.e., environment, social and governance scores, are positively driving corporate credit ratings. This aligns with the signaling theory, where firms release signals and CRAs receive them (Bhattacharya and Sharma, 2019). Moreover, the results validate an inverse relationship between credit ratings and the cash conversion cycle, leverage, and inflation rates. On the contrary, EBIT margin, GDP growth rate, and firm size have a positive impact on credit rating. For instance, larger firms with increased profitability, lower leverage and cash conversion cycle, reduced inflation rates and a higher GDP growth rate would have a better credit rating. Furthermore, the results show that the firm's sector influences the credit rating, whereas the firm's country does not. The robustness of the results was tested over different sample periods, and the results fully confirm the findings of this thesis over the three subsample periods.

The second part of chapter Four analyzes the impact of the corporate credit ratings on the share price using the same sample as model 1. A panel dataset for the firms' share price is extracted from the LSEG Data and Analytics platform for the period 2008-2022. The panel regression model is used to study the impact of credit ratings on share price as well as the moderating role of ESG in strengthening the relationship between credit ratings and share price. The selection of this model is

considered appropriate due to the varying nature of the dependent variable, i.e., the share price, which is a discrete random variable. The results of the empirical estimation technique illustrate the Hausman Test (χ^2) which confirm that the fixed-effect model is the most suitable for share prices. In addition, the F-statistics of the model validate that the regression model is highly significant. The independent and control variables used were the credit ratings, ESG overall score, environmental score, social score, governmental score, EBIT margin, leverage, firm size, GDP growth, and inflation rate.

The empirical findings demonstrate that the corporate credit ratings are observed to have a significant positive impact on share prices which indicates that a greater credit rating will cause an increase in share price. In addition, the overall ESG score and each of its pillars are associated with having a moderating impact on the firm's share price. This aligns with the information asymmetry and legitimacy theories, where the release of ESG disclosure reduces the knowledge gap between the firm and its stakeholders. Consequently, the firm is rewarded with higher share prices due to its adherence to societal obligations (Bamahros et al., 2022; Khandelwal et al., 2023). This significant interrelationship brings forth the moderating power of ESG between corporate credit ratings and share price. As confirmed by the findings, the overall ESG score and each of the E, S, and G components act as a moderator in strengthening the relationship between the corporate credit ratings and share price. Furthermore, the results confirm an inverse relationship between share price and the leverage, GDP growth, and inflation rate. Whereas EBIT margin and firm size have a positive influence on the share price. This indicates that larger organizations with higher profitability, lower leverage, reduced GDP growth and inflation rates would have higher share prices.

In summary, the empirical investigation in this thesis answers the research question that the overall ESG score, and its standalone pillars have a positive impact on the corporate credit ratings as well as it has a moderating impact in strengthening the relationship between credit ratings and share price. This means that when a firm practices ESG more efficiently within all its pillars, they can expect to be incentivized in terms of increased credit ratings and share price (Chodnicka-Jaworska, 2021; Z. Li et al., 2022). In addition, the findings confirm that ESG scores and its pillars strengthen the relationship between credit ratings and share price. This indicates that credit ratings are more likely to positively impact the share prices in a firm that adopts greater ESG strategies. Hence,

reiterating that the firms can benefit from allocating resources into ESG developing projects and activities.

5.2 Limitations and Recommendations for Future Research

Despite the significant positive relationship between ESG and corporate credit ratings and share prices, this thesis demonstrates few limitations. First, the study sample excluded the entire African continent due to missing data, especially credit ratings, which were very difficult to extract. This restricted the generalizability of this study to all the five continents of the world. With the recent implementation of the Green Recovery Action Plan, designed to promote sustainable economic recovery, by the African Union, it would be insightful to understand the impact of sustainability practices with the inclusion of the African continent (Yimer, 2024). As a result, this thesis recommends that future researchers expand the scope further by including African firms.

Second, this thesis excluded financial institutions due to their unique asset and liability structures. Therefore, further research can be conducted using a standalone study involving financial institutions to investigate the impact of ESG on the credit ratings and share prices of financial institutions. This could help understanding the different stakeholder preferences and the firm's ESG commitment within the financial and non-financial industries.

Third, the results also reveal interesting findings that the firm's sector influences credit ratings. This could be investigated further to examine the sectoral implications for the relationship between ESG and credit ratings, which could enable a comparative study according to economic sector divisions. In addition, the sample could also be further analyzed by splitting the data by year to check if the results vary during the pre-crisis, crisis, and post-crisis periods when there are financial constraints placed on firms.

The fourth limitation in this study is that it only includes the analysis of one credit rating agency, Moody's. As discussed in the thesis, each CRA has different rating scales and measurement methods. In addition, the ESG rating data is obtained from a single data source, the LSEG Data and Analytics platform. Hence, to ensure the generalizability of the results, this study recommends that future research include the other two chief CRAs: Standard and Poor's (S&P) and Fitch, as well as alternative ESG rating sources such as the Kinder, Lydenberg, and Domini (KLD) database (Korinth and Lueg, 2022). Furthermore, a comparative analysis between the different CRA ratings

could further help understand which agency most considers the firm's ESG practices in their creditworthiness assessments. This could help sustainable investors to be careful in choosing the appropriate CRA ratings when making their investment decisions.

Finally, as highlighted in the thesis, this is the only study that tested the moderating role of ESG between credit ratings and share price. This paves the way for future research to further explore this relationship using other econometric models, methodologies, and control variables in order to gain a deeper understanding of ESG's role using other theoretical propositions such as the stakeholder and the shareholder theories.

5.3 Practical Implications

Overall, this research has some practical implications for various stakeholders. Firstly, this thesis recommends firms to enhance their ESG performance in order to secure a higher credit rating and share price. The disclosure of ESG-related data by listed firms provides investors with a greater awareness of the investee firm's environmental and societal responsibilities, in addition to their adherence to the high standards of corporate governance. Consequently, the score determined by their ESG performance will impact the share price of the listed firms (Yin et al., 2023). For instance, the financial statements of Tesla, an all-electric vehicle firm, were underperforming for years. However, in 2020 the market capitalization of Tesla reached \$280 billion, exceeding General Motors which were significantly higher in terms of profit margin and operating income. This success of Tesla was associated with their positive environmental contribution in manufacturing energy efficient vehicles, which attracted the attention of the investors and resulted in greater stock returns (Yin et al., 2023). Hence, by a larger investment on environmental management and technologies, firms can not only attain a greater market share, but also efficiently advocate for their commitment towards sustainable development and improvement of economic efficiency (Jin and Lei, 2023). This thesis therefore encourages the managers to realize the significance of ESG disclosure to impact corporate credit rating and its moderating role in strengthening the relationship between credit ratings and share price. Hence, it is critical to provide market participants with detailed ESG-related data, and to practice proactiveness in sustainability matters in order to meet the requirements of the stakeholders, as in the legitimacy theory (Bhattacharya and Sharma, 2019).

Secondly, shareholders and potential investors should carefully consider the corporate ratings before they invest because credit ratings incorporate the firm's ESG performance and have an

impact on share prices. This not only safeguards investors from possible investment losses resulting from short-term perspectives, but also compels firms to enhance their ESG performance (Zheng et al., 2022). Furthermore, the results illustrate that organizations with superior ESG practices tend to achieve a greater market valuation and hence, accounting for the firm's ESG practices when making investment decision could likely result in higher investment performance (Ademi and Klungseth, 2022).

Thirdly, the portfolio managers should assess both the ESG sustainability factors and corporate credit ratings of the firms when managing the portfolio of investors. The Big Three asset managers, i.e., the State Street, Vanguard, and Blackrock, have already integrated ESG components into their portfolio investment risk management and evaluation, with over a quarter of total assets invested in sustainable firms (Ng and Rezaee, 2020). The findings of this thesis recommend that these practices be adopted globally in order to build a portfolio which includes sustainable investments.

Finally, this thesis recommends that policymakers impose strict rules to encourage firms with low ESG performance to take the necessary corrective action. Though there are several global institutions attempting to standardize the disclosure structure of ESG sustainability elements, it is still less structurally developed. Therefore, pertaining to the results of positive association between ESG performance and share price as well as corporate credit ratings, this study suggests that adequately regulated and standardized ESG performance disclosure requirements must be integrated into corporate reporting (Ng and Rezaee, 2020). Furthermore, to ensure that there is consistent, comparable, and reliable ESG information available to the stakeholders and investors, the government and supervision divisions need to establish necessary regulatory mechanisms (Xu et al., 2023).

5.4 Social Implications

Environmental issues, consumer safety, investor protection, and labor-capital associations are all among the major concerns faced by the government and the society (Wu and Hu, 2019). The practice of sustainability would aid to ensure societal growth does not compromise the ability of future generations to meet the same requirements (Korinth and Lueg, 2022). In the quest for a long-term value generation, the firms can convey their commitment to ESG performances by using ESG disclosures to signal its stakeholders. When this source of ESG education for stakeholders increases, their business operations credibility is enhanced and thereby strengthening its

relationship with the society (Velte and Stawinoga, 2020). This thesis encourages firms to undertake higher ESG responsibilities to reflect their responsibility and build trust with society. This social trust can enhance the transmission efficiency of information between management and stakeholders, which contributes to mitigating the damaging impacts on both the stock market and society during any market turmoil (Xu et al., 2023).

Furthermore, the findings of this research reinforce the importance that society and stakeholders place on sustainability practices, which is evidently observed through the impact of ESG on credit ratings, and its moderating role in strengthening the relationship between credit ratings and share price. Hence, firms are encouraged to engage in developing sustainable business models that address critical environmental, social and governance concerns. For instance, the integration of CSR practices at all stages and promotion of sustainability efficient use of natural resources. These efforts to minimize harmful carbon emissions, pollution, and potential risks to society help to promote a sustainable future where the organization and its stakeholders can coexist in harmony (Sandberg et al., 2022). This is also supported by the legitimacy theory that the firm runs its operations through the existence of a social agreement between the firm and the society, to meet the stakeholder expectations (Shakil, 2020).

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