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**THE EFFECT OF ENVIRONMENTAL, SOCIAL, GOVERNANCE (ESG) ON
COST OF EQUITY CAPITAL (COEC): EVIDENCE FROM FINNISH LISTED
COMPANIES**

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ABSTRACT OF THE MASTER'S THESIS

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| <p>Abstract</p> <p>The importance of corporate social responsibility (CSR) and non-financial disclosures to investors and other stakeholders has grown in recent years. Companies acknowledge that ESG (environmental, social, and governance) disclosure has a substantial impact on brand recognition, investment choices, the company's public image, and stakeholders' understanding of environmental, social, and governance concerns. By offering ESG ratings and sharing pertinent information, businesses may show their commitment to responsible business practices and increase their openness. This improved openness not only encourages investor and stakeholder confidence, but also reduces organizations' exposure to risk. Investors and stakeholders increasingly see ESG performance as a crucial determinant of a company's long-term resilience and sustainability. Understanding the link between ESG disclosure, transparency, and risk is essential for businesses looking to develop trust, attract investments, and navigate the rapidly changing environment of sustainable business practices.</p> <p>This study examines the association between ESG as a type of non-financial company information and COEC for listed Finnish firms from 2003 to 2022. In addition, we attempt to determine whether the relationship between ESG and COEC differs between industrial and non-industrial units. Furthermore, we seek an answer to the question, "Is this relationship growing stronger over time?"</p> <p>This thesis sample consists of 405 observations of Finnish listed firms collected from the Refinitive database. These listed companies were gathered from the Helsinki Stock Exchange. The ESG score is the independent variable, whereas the COEC is the dependent variable (cost of equity capital). In addition, control variables such as firm size, represented by the natural logarithm of total assets (LN TA), leverage, and market-to-book ratio (MTBR), as well as dummy variables including industry and annual dummy variables for every three years, were added to the original models.</p> <p>The regression results indicate that there is a negative association between ESG and COEC, however this relationship is not significantly stronger among industrial enterprises. Although the results for our last hypothesis were not statistically significant, we can observe that the influence of ESG on the cost of equity capital (COEC) grew larger before 2018 and then reversed. The first result is consistent with existing studies; however, there is no comparable research for our second and third results.</p> <p>To be able to draw broad conclusions about ESG and the standardization of ESG measurement and impact among non-listed or small- and medium-sized businesses, additional research is required. In addition, it is possible that future research will investigate the ways in which companies that have high ESG ratings are affected by stock market shocks like the one that was brought on by the epidemic.</p> | | | |
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1 Introduction

Both the business sector and the public have begun to place a higher value on corporate social responsibility (CSR) in recent years. Businesses nowadays must not only meet financial goals but also do business in a manner that is both environmentally and socially responsible., taking into account concerns such as social relations, climate change, and open governance. (Votaw 1972) provides instances of how CSR can be viewed in a variety of ways: It is seen as "legal duty" by some. or liability; to others, it means acting morally and ethically; to one, it is equivalent to the charitable activities of businesses; and to others, it has to do with social awareness. Even though the defining problem is old, nothing has changed for the better. (Votaw 1972; Garriga & Mele 2004).

In accordance with the findings of the World Business Council for Sustainable Development (WBCSD) study from 2000, one typical definition of CSR "Corporate Social Responsibility" is the continual commitment made by companies to behave in a moral manner, to promote economic progress, and to increase the quality of life for the benefit of their staff, the families of those workers, the community at large, and society as a whole. (Watts & Holme 2000).

As a direct consequence of this, businesses have started to focus on problems related to CSR and have begun devoting resources to activities related to CSR in order to fulfill the requirements imposed on them by a variety of stakeholders. (Menz 2010; Hoepner, Oikonomou, Scholtens, and Schröder 2016).

To lessen the detrimental impact on the community in which they do business and the impact of their activities on that community, businesses should make use of their resources and adopt policies, processes, and initiatives. (Vitolla et al., 2020) Because CSR is relevant, non-financial information is becoming more and more significant (Vitolla et al., 2019; Nicola et al., 2021). In reality, say (Garca-Sánchez et al., 2020; Salvi et al., 2020; 2021), financial disclosure on its own cannot fulfill the informational requirements of the multiple parties involved and prospective donors.

The voluntary disclosure of non-financial information, particularly ESG information, is becoming more and more significant as a result, and corporate papers that take into account social and environmental impacts, such as reporting, social impact reports, and environmental

impact reports, are gaining in significance. (Raimo et al., 2020; Salvi, Vitolla, Raimo, et al., 2020).

ESG is a system that acts as an approach that includes environmental (E), social (S), and governance (G) factors. The idea is where it originates from responsible investment. Responsible investment is characterized by a set of guiding principles for Responsible Investment (PRI) as a strategy and practice that incorporates ESG factors into investment decisions and active ownership ("An Introduction to Responsible Investment I," n.d.). As a result, ESG is often utilized by investors as both a benchmark and a technique to analyze the conduct of corporations and the future financial success of such corporations.

ESG disclosure is becoming increasingly important to organizations because it has the ability to improve brand recognition, support investment choices, and improve corporate image. In fact, it may raise stakeholders' understanding of issues including issues pertaining to disposal, pollution, emission, working conditions, human rights, gender equality, and corporate governance. (Raimo et al. 2020).

As a result, investors are better able to assess the firm's potential future performance as well as the risks and opportunities associated with that performance when appropriate and transparent ESG information is provided. (Albarrak et al., 2019) Disclosure of information that is not related to financial matters might potentially help close the knowledge gap that exists between the company and investors. (Vitolla and Raimo 2020) assert that the latter provides financial benefits that also result in lower capital costs.

Aside from the fact that studies on the impacts of non-financial exposure on the cost of capital have been carried out in the past, ESG issue disclosure has not gotten enough attention. This kind of disclosure is gaining an ever-increasing amount of significance due to the implications that ESG considerations have on firm prestige, an advantage over rivals, and the choice process of investors (Tamimi and Sebastianelli, 2017).

The incorporation of all ESG elements helps investors assess the prospects, risks, transparency, and future performance of the underlying companies (Albarrak et al., 2019). Companies may want to consider lowering the cost of equity financing in light of this situation. Despite the correlation between ESG and lower capital costs, non-financial disclosure has been shown to have no effect on the cost of equity capital. (Salvi, Vitolla, Raimo, et al., 2020; Raimo et al.,

2020). When determining whether or not an investment would satisfy the firm's needs for the return on its capital, a corporation will look at the return on its cost of equity capital. Companies often use it as a benchmark for capital budgeting when calculating the needed rate of return. The cost of equity capital for a company is the compensation in return for which the market is asking for holding the property and being responsible for the associated risks of ownership. This is what the market is asking for in exchange for having ownership of the asset. There are a couple of models for capital asset pricing and the dividend capitalization model that have been historically used in the process of calculating the cost of equity capital (CAPM).

1.1 Previous literature

The connection among disclosure and capital costs has lately received a lot of attention from researchers, with a focus on disclosure's impact on a connection and the cost of equity capital and influence is not being fully considered on the cost of debt financing (Raimo et al., 2021).

The first part of the literature examines how voluntary disclosure affects the situation. According to voluntary disclosure theory, high-performing businesses may distinguish themselves from underperformers and prevent adverse selection issues by freely disseminating information (Verrecchia, 1983; Vitolla et al., 2022). According to this interpretation, companies with greater results are more likely to more information because They have high hopes for the stock market. (Michaels and Grüning, 2017; Reverte, 2012).

Companies that have performed the worst, nevertheless, in contrast to that, tend to share less information to lessen the impact of the potential adverse effects related with the increased financial risk that investors could tag because of this finding (Dhaliwal et al., 2011).

In this regard, they discover a substantial inverse association between the cost of stock for businesses. Having a small number of analysts monitoring it (Botosan, 1997) and the amount of information that is presented by corporations in their annual reports. In addition, Hail (2002) finds comparable results in an examination of 73 Swiss company annual reports, highlighting a detrimental impact of voluntary information disclosure on the cost of stock.

Moreover, (Clarkson et al. 2013) contend, however, cannot find statistically strong association between environmental disclosure and the cost of financing. Instead, (Albarrak et al. 2019) look at the effect of carbon footprint disclosure, and their findings imply that the former helps to lower

equity costs. However, Richardson and (Welker 2001) emphasize a positive link between social disclosure and the cost of equity, indicating that a higher level of social openness raises the cost of equity capital. Intellectual capital disclosure is examined in another body of literature. In this regard, (Kristandl and Bontis 2007) divide information about intangibles into historical and forward-looking categories and find that historical information has a negative impact on the cost of equity capital whereas forward-looking information has a favorable impact.

According to (Orens et al. 2009), the publication of information about intellectual property reduces information asymmetries and lowers equity costs. Through research on 126 British companies, Mangena et al. (2010) further support this finding. Finally, Vitolla et al. (2020a) emphasize how integrated reports with high-quality information have lower equity costs.

Despite strong theoretical backing for the claim that transparency raises the cost of equity capital, actual study findings are less reliable and consistent (Core, 2001; Healy and Palepu, 2001; Kothari, 2001; Botosan, 2006; Zhou et al., 2017).

These conditions also apply to ESG disclosure for investors, who are now often regarded as the primary beneficiaries of such disclosure (Dhaliwal et al. 2011; Michaels and Grüning, 2017; Plumlee et al., 2015). Lower cost of capital is one of the key benefits connected with the distribution of ESG information and is also one of the main possible repercussions of ESG disclosure (Dhaliwal et al., 2011; Michaels and Grüning, 2017). This is in keeping with the voluntary disclosure idea.

Although there is a lot of theoretical evidence in the present research for the adverse connection which can be found between disclosure and the Cost of equity capital, actual results are less consistent (Botosan, 2006; Clarkson et al., 2013; Healy and Palepu, 2001; Richardson and Welker, 2001; Zhou et al., 2017). This situation might be brought on by a number of factors, including missing variables (Francis et al., 2005; Zhou et al., 2017), intermediary involvement (Griffin and Sun, 2013), and the manner and frequency of information distribution (Botosan and Plumlee, 2002; Kothari et al., 2009).

The same principles that apply to cost of equity capital disclosure also apply to ESG disclosure. It is obvious that ESG data has the ability to assuage investors' uneasiness, who are becoming more and more concerned with social, environmental, and governance issues. Having a reliable ESG performance representation also makes it possible to lessen information asymmetry between

businesses and investors (Raimo et al., 2020).

ESG disclosure also enables investors to accurately evaluate company transparency, prospects, and most importantly the dangers connected with business activity (Albarrak et al., 2019; Ng and Rezaee, 2015; Yu et al., 2018). Corporate sustainability initiatives may lower operational and market risk, and investors particularly value them (Chen et al., 2023).

ESG disclosure rules are necessary since considerable risk and value information are not adequately covered by financial disclosure, which does not incorporate ESG information (Michaels and Grüning, 2017; Tamimi and Sebastianelli, 2017). Notably, ESG disclosure can lower the specific crash risk for businesses:

- I. expanding the quantity of information corporations provide to investors
- II. giving shareholders important information (for example, information about litigation risks and concerning environmental and social liabilities)
- III. discouraging the theft of business assets
- IV. quickening the business model's change process (da Silva, 2022).

1.2 Purpose of this thesis

In order to close this research gap, the goal that will result from this research is to examine how ESG disclosure affects the price of equity. This argument is crucial because it emphasizes the need to concentrate attention on a particular industrial sector so that peculiarities and industry-specific specificities may be taken into consideration when evaluating non-financial disclosure. This study intends to examine the link between ESG disclosure in the Finnish listed company and the price of equity capital in this industry based on what has been mentioned thus far. Companies that declare CSR have less unfavorable news reports and litigation and obtain more government subsidies (Chen and Xie 2022, He et al. 2022) and provide evidence that ESG participation may lower firms' idiosyncratic risk by sharing more non-financial information to lessen investors' divergence, which supports these findings. ESG disclosure expands the pool of long-term investors. In this context, Amel-Zadeh and Serafeim (2018) showed that the majority of investors consider ESG disclosure when making investment decisions because they view ESG information as important for future investment returns.

It has been shown that improved access to financial resources for firms is correlated with increased levels of ESG disclosure, as shown in Rimo, de Nuccio, et al. (2020), which tested the relationship between ESG disclosure and equity capital costs in the food and beverage industry using a fixed-effects panel regression model. According to their findings, the cost of equity capital is negatively affected by ESG disclosures. Furthermore, a study (Raimo et al., 2024) indicates that a broader ESG disclosure allows H&T firms to reduce the cost of equity capital. Financial benefits can be generated by ESG disclosure, according to these findings.

It is reasonable to predict that ESG disclosure will lower the cost of equity capital due to its capacity to decrease information asymmetry, allow proper risk assessment, and draw in long-term investors. In addition, we are planning to conduct an investigation into the possibility that the relationship between ESG disclosure and the cost of equity capital (COEC) is not the same for industrial and non-industrial businesses. It would appear that industrial organizations have a significantly stronger correlation between COEC disclosure and ESG disclosure when compared to other categories of businesses. Industrial companies that conduct their operations in fields that have major adverse effects on the environment are subject to a higher level of scrutiny from various stakeholders regarding their ESG strategy.

Furthermore, growing public knowledge puts pressure on businesses to lessen the harm they cause to the environment, and it draws more attention from the public to organizations that are environmentally responsible. Because of this, it would appear that investors and the general public have placed a greater emphasis on the need for ESG disclosure in recent years. Following the above discussion, we propose the following questions and theories:

1. Does ESG disclosure have an impact on the cost of equity capital (COEC)?
2. Is there a difference between industrial and non-industrial enterprises in the relationship between ESG disclosure and the cost of equity capital (COEC)?
3. Is the relationship between ESG and the cost of equity capital (COEC) strengthening over time?

1.3 Framework and structure of the research

There will be seven sections to this study. The first chapter will introduce the study's context, preceding research, purpose, and research question. The second chapter will focus on the context of CSR and ESG disclosures. In the third chapter, we will describe the relationship between ESG and the cost of equity capital. The fourth chapter will focus on hypotheses. The fifth chapter provides an overview of the research data and methods. In addition, this chapter explains the search model, research population, sample size, and data source. The sixth chapter offers a conclusion, recommendations, and a discussion of their ramifications. The seventh chapter concludes the research and gives relevant policy implementation recommendations for the study's audience.

2 Corporate Social Responsibility (CSR) and ESG responsibility

2.1 Introduction

Companies nowadays are more conscious of the need for social responsibility and environmental sustainability than ever before. Complementary responses to this tendency include the ideas of CSR and ESG accountability. The ideas of stakeholder theory, legitimacy theory, agency theory, and voluntary disclosure will all be discussed in this chapter, along with their respective foundational assumptions and historical developments. We will investigate not just the value of ESG disclosure but also how it is now being measured and where it is in Finland. When you've finished this chapter, you'll have a firm grasp of the meaning of CSR and ESG in the context of modern business practices, and you'll know how each term relates to the others.

2.2 Meaning and definitions

ESG and CSR are interconnected, overlapping, and interdependent concepts. Today, CSR is gaining more and more significance as time goes on in academic discourse. As environmental complexity increases and as a result of recent financial scandals involving a number of the most successful worldwide firms, the necessity of integrating social responsibility into business strategy and using it as a tool to gain lasting competitive advantages has become more pressing in recent years. (Carroll, 1991; Galbreath, 2009; Vilanova, Lozano, & Arenas, 2009; D'Amato & Faliveno, 2020).

CSR is the voluntary inclusion of social and environmental issues into a business's operations and connections with its stakeholders (Clegg et al., 2015; Raimo, Petruzzella, Salvi, & Vitolla, 2024). Policies, procedures, and initiatives need to be implemented by firm and resources should be used to mitigate the negative impacts of their operations on the communities in which they operate (Jamali et al., 2010; Vitolla et al., 2020, Raimo, Petruzzella, Salvi, & Vitolla, 2024). To achieve environmental and social objectives, organizations should reevaluate their business models and include CSR into their corporate agendas (Garca-Sánchez et al., 2021; Raimo et al., 2021b; Raimo, Petruzzella, Salvi, & Vitolla, 2024).

Since 2001, when it released a Green Paper (Commission of the European Communities, 2001), the European Commission has urged businesses to implement a CSR strategy; in 2011, it amended the European policy on CSR (European Commission, 2011). The distribution of the

Sustainable Development Goals by the United Nations (UN), which highlighted the importance of environmental and social issues for firms and nations alike in achieving sustainable growth, has also highlighted the significance of this topic. CSR is vital not only for businesses but for society as a whole, as creative and sustainable practices create a more sustainable economy. Specifically, CSR initiatives have become an increasingly important component of business strategies, with the initial objective of protecting and consolidating the corporate image among company stakeholders for long-term success (Ruf, Muralidhar, Brown, Janney, and Paul, 2001; Wood, 2011, D'Amato, and Falivene, 2020).

In fact, financial disclosure alone cannot satisfy the information needs of all stakeholders and prospective capital providers (Garca-Sánchez et al., 2020; Salvi et al., 2020a; Raimo, Petruzzella, Salvi, & Vitolla, 2024). For this reason, the voluntary release of non-financial information, particularly ESG information, via business documents such as integrated reports, social reports, and environmental reports is gaining importance worldwide (Raimo et al., 2020; Salvi et al., 2020b; Raimo, Petruzzella, Salvi, & Vitolla, 2024).

The ESG framework takes into account environmental, social, and governmental factors. Its guiding principle is responsible investment. The Principles for Responsible Investment (PRI) provide a set of guidelines for making investment decisions and exercising ownership in a way that takes into account ESG factors. Many financiers use ESG metrics to evaluate companies' operations and future prospects for profit.

2.3 The History and theories

Various historical events and shifting cultural expectations have contributed to the development of the idea of CSR and ESG practices. This section examines the theoretical foundation of CSR and ESG, giving readers a full picture of these concepts from their inception to the present day.

2.4.4 History of CSR and ESG

Prior to the mid-1990s, the first and most prevalent form of socially oriented or socially responsible investment (also known as "SRI") was negative screening, or the conscious choice not to invest in firms or industries that did not match one's own ideals. The investing strategy is historically based on the actions of religious believers (of Judaism, Christianity, and Islam) who strove to align their investments with their faiths, such as Quakers in the 1500s and

churches in the 1920s that condemned gambling, tobacco, and alcohol. SRI refers to a values-based or exclusionary investing approach that primarily addresses corporate social, ethical, and environmental conduct and, following the 1987 Brundtland Commission 16, the consequent "sustainability" of a firm. After the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, public and political support for sustainable development gained steam. (Fulton, Kahn, & Sharples, 2012)

Since the 1950s, modern CSR has been a significant and expanding concern. Evidence of firms aiming to enhance society, the community, or specific stakeholder groups extends back centuries (A. B. Carroll, Lipartito, Post, & Werhane, 2012; Archie B. Carroll, 2016). The focus of this debate, however, will be on notions and behaviors that have marked the age following World War II. However, evidence of its applications, frequently under different names, traditions, and justifications, has been surfacing all over the world (Archie B. Carroll, 2016).

Howard R. Bowen's publication of *Social Responsibilities of the Businessman* in 1953 marked the beginning of the modern era of CSR, often known as social responsibility. Bowen's study was motivated by his opinion that the few hundred biggest firms in the United States were essential power and decision-making centers, and that their activities had a significant impact on the lives of people.

Bowen presented the essential question that is still debated today: "What responsibilities to society may businessmen be expected to assume?" (Schnepf & Bowen, 1954; Archie B. Carroll, 2016) In addition, Freeman (1984) presented the stakeholder theory, which pushed enterprises to satisfy all stakeholders. In the 1990s, businesses began to face new challenges as a result of globalization's impact on the business environment. However, globalization also created new opportunities to use CSR to gain a competitive advantage and hastened the institutionalization of CSR (Archie B. Carroll, 2015).

According to some specialists, its prevalence has increased in recent years, and it is presently the most common (Sweeney, 2007; Eférek, 2022). Corporate executives, government officials, and academics are increasingly concerned with the concept of "CSR." Nearly all corporate websites, policies, and reports discuss their CSR efforts, which has become a means of ensuring that the organization fulfills all of its societal obligations and is therefore eligible for an operating license. ensures that the firm can expand in a sustainable manner (Sharma, Sharma,

& Devi, 2009; Efránek, 2022). CSR is widely understood to be a corporation's response to society's problems, such as human rights and the environment (Miller and Guthrie, 2007; efránek, 2022; Rahim, Jalaludin, and Tajuddin, 2011; efránek, 2022). The function of business in society is no longer limited to generating profits but also to acting responsibly toward stakeholders.

In the opening years of the new millennium, there was a surge in attention to and need for a clearer definition of SRI that included corporate governance in addition to financial, social, and environmental concerns. The Sarbanes-Oxley Act of 2002 was a manifestation of the growing awareness among academics and investors (especially in the United States) of the importance of good corporate governance in a company's risk and return profile, a trend that was influenced in part by Moskowitz's classic analysis of the "100 Best Companies to Work For" (1998).

Institutional investors are increasingly concerned with the dangers and possibilities given by a company's non-financial performance as a result of the widespread belief that big asset owners are "universal owners" related to the success of markets or economies as a whole. It was crucial that this revised definition put more emphasis on risk and return in light of the extensive discussion concerning the underperformance (or lack thereof) of SRI from the 1980s to the 21st century (or profit). Responsible investing, a kind of SRI centered on risk and return, originated around this period. There is "agreement [among analysts] that environmental, social, and corporate governance concerns effect long-term shareholder value," according to a study commissioned by the UNEP Finance Initiative (UNEP FI) in 2003 and resulting in 11 papers from 9 prominent research institutes (forthcoming in 2004). Two years later, in April 2006, UN Secretary General Kofi Annan launched the Principles for Responsible Investing, which mainstreamed SRI, coined a new term for risk- and return-driven investors ("Responsible Investors"), and refined the definition to include those investors who incorporate ESG factors in their investment process. in a 2012 study (Fulton, Kahn, & Sharples).

- *CSR theory:*

It is possible to comprehend the potential benefits and costs of CSR by evaluating several CSR concepts. The concepts of legitimacy theory, reputation risk management, and exclusivity costs

As creating and reporting information are costly endeavors, companies may disclose CSR information for a variety of reasons. Furthermore, mandatory and voluntary CSR disclosure regulations vary significantly between countries. Some nations (e.g., Europe and India) require or specify particular aspects of CSR disclosure for corporations, whereas others (e.g., Brazil and China) are more flexible (Wang, Tong, Takeuchi, & George, 2016; Ma, Zhang, Zhong, & Zhou, 2020).

- *Voluntary disclosure theory:*

According to Dye (1985) and Verrecchia (1983), voluntary environmental disclosure is associated with better environmental performance. This theory proposes that leading environmental performers will "come out of the closet" by emphasizing objective environmental performance criteria that are hard to replicate by less capable competitors. Companies with poor environmental records will likely choose less transparency or silence, grouping them with mediocre performers in the eyes of investors and consumers. Why is information being kept secret? Balanced against the unknown character of the corporation are the private costs of environmental performance disclosure (Verrecchia, 1983). (Dye, 1985). Since poor environmental performers face more political and social limits and legitimacy concerns, it stands to reason that they will try to raise discretionary environmental disclosures in order to influence stakeholder opinions of their actual performance. This was shown to be the case (Hummel & Schlick, 2016).

This may entail divulging details about their CSR programs. CSR is the commitment of a company to operate in an economically, socially, and environmentally responsible manner (CSR). This may include initiatives to reduce their impact on the environment, assist their employees and communities, and adhere to ethical business practices.

Numerous businesses participate in CSR activities to enhance their reputation, attract and

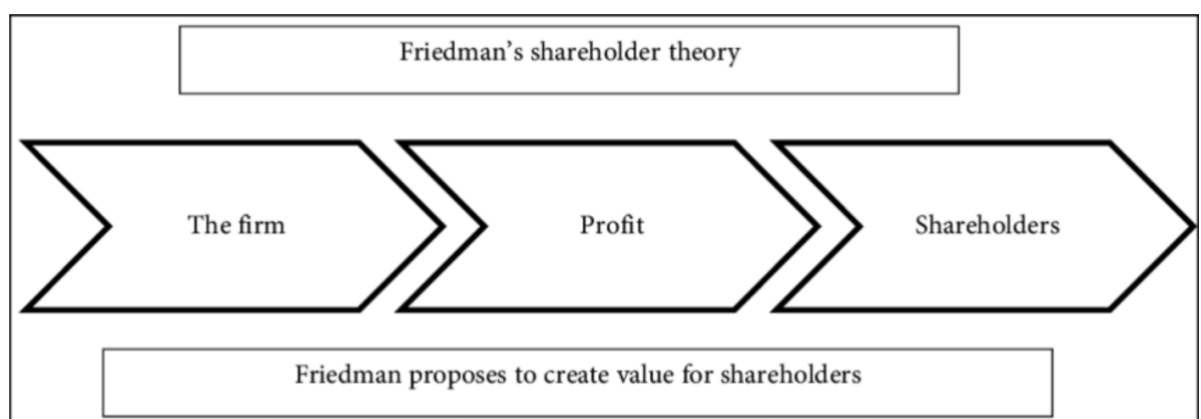
retain customers, and improve their overall financial performance. By freely releasing information about their CSR activities, businesses may demonstrate their commitment to ethical business practices and perhaps gain a competitive edge.

It is essential to note, however, that voluntary release of CSR information does not always imply that a company engages in responsible business practices.

- *Shareholder theory:*

Friedman (1962) asserts that the primary objective of businesses is to maximize profits. According to this shareholder perspective, corporations use their resources inefficiently when they invest in CSR programs instead of other more profitable operations, so harming the interests of their shareholders. Friedman (1962) emphasizes that governments are expected to take into account the interests of other parties when implementing measures such as taxes and regulations. The shareholder hypothesis is typically criticized for its emphasis on the short term. This notion is supported by Bird, Hall, Momentè, and Reggiani (2007), who show that CSR-related excess returns are only detectable over the long run. This may be owing to the fact that CSR initiatives sometimes incur substantial short-term costs before their benefits are realized.

Figure 1 Shareholder Theory

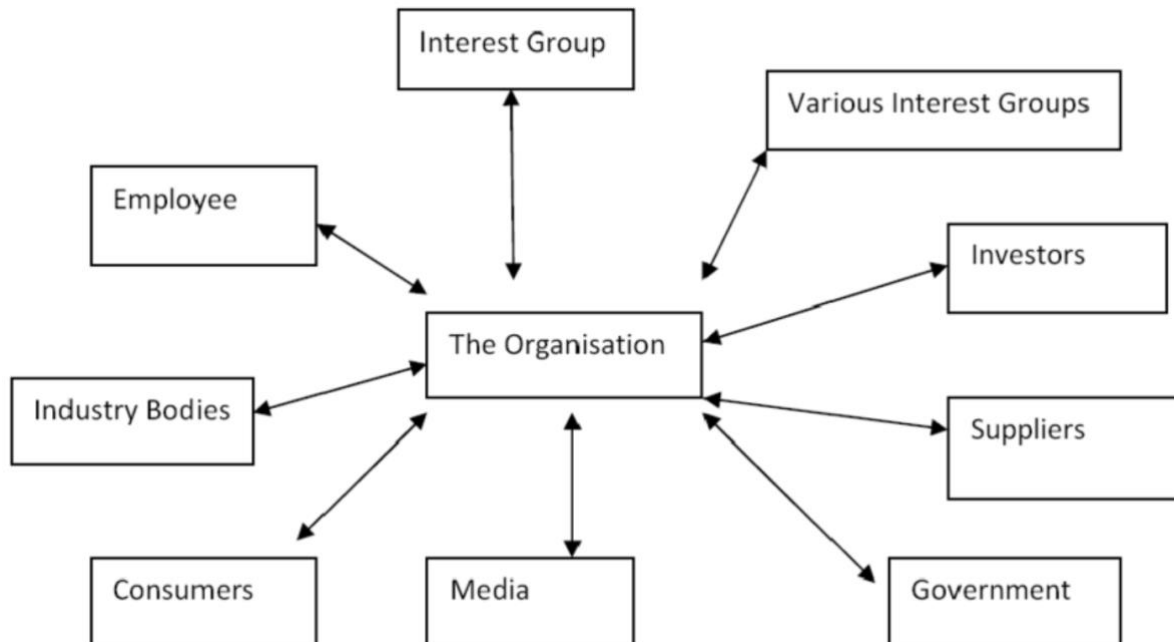


- *Stakeholder theory:*

Freeman (1984) reminds us that firms must also consider other stakeholders, such as customers, workers, suppliers, creditors, and governments, in addition to shareholders. According to (Pedersen & Jeppesen, 2015), firms may optimize their CSR inputs to respond to the interests of all stakeholders while maximizing profits. Investments in working conditions, customer and consumer interactions, for instance, give long-term returns that can only benefit business members without creating any harm (Pedersen 2015).

Today, a company's relationship with its stakeholders is essential to its success, and as a result, companies invest significant sums of money to strengthen their relationships with various stakeholders (Krüger 2015; Bhuiyan & Nguyen 2019). In addition, Ge and Liu (2015) assert that CSR minimizes information asymmetry and litigation risk, which benefits capital market agents.

Figure 2 Stakeholder Theory (Al Mamun, Rafique Yasser, & Ashikur Rahman, 2013)



- *Agency theory:*

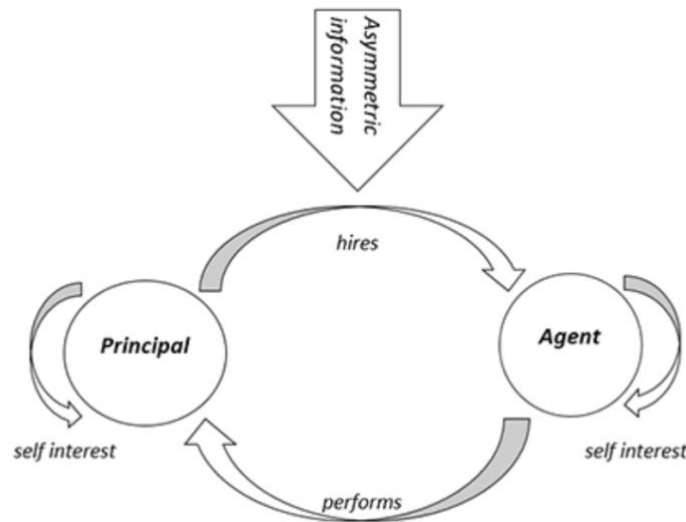
Agency theory discusses the intricate interplay between organizational stakeholders. The relationship between the principal and the agent is at the core of this economic and management theory. Typically, the principal is a business owner, shareholder, or investor who employs an agent to complete tasks on their behalf. The agent, on the other hand, is a manager, executive, or employee who is recruited to operate on behalf of the principle.

Principal and agent may have conflicting interests, according to the core concept of agency theory. There may be an "agency problem" if the agent prioritizes his or her personal interests above those of the principal. This difficulty develops as a result of the agent's superior knowledge and control over the resources. The principal in this case refers to the business's security holders, whereas the agent refers to the management who govern the firm. (Fama, 1980)

Information asymmetries and moral hazard or adverse selection problems are frequent causes of agency relationship difficulties. Before an exchange or agreement occurs, adverse selection occurs when the agent is better-informed and behaves inappropriately from the principal's perspective. In contrast, moral hazard occurs when a better-informed agent acts against the principal's interests following an exchange or agreement by modifying their conduct. (Ciliberti, de Haan, de Groot, & Pontrandolfo, 2011)

From the standpoint of agency theory, CSR may be viewed as a solution to the agency problem. By operating in a socially responsible manner, corporations may indicate to stakeholders, including shareholders, that they are working in their best interests, even though short-term earnings may not be maximized. This can help reduce the agency problem by matching the principal's (shareholders') and the agent's (manager's) interests (management).

Figure 3 Agency theory (Chelniciuc, 2014)



- *Overinvestment and agency conflict theory:*

CSR creates agency conflicts between business management and stakeholders, according to the overinvestment thesis. By overinvesting in responsibility initiatives that do not add value to the business, managers are enhancing their own reputations (Bartkus, Morris, and Seifert, 2002; Barnea and Rubin, 2010). Lenders are more willing to increase loan interest rates for over-invested CSR businesses, as this form of inefficient resource consumption creates risks and makes the company more vulnerable. A recent study on the relationship between bank loan spreads and CSR demonstrates that extraordinarily high CSR levels increase loan spreads. Banks will punish firms that overinvest in CSR, as such expenditures are costly and do not contribute value. This feature is exclusive to the private lending market and can be explained by banks' stronger access to firm-specific information than other lenders (Bae, Chang, & Yi 2018a; Goss & Robert 2011).

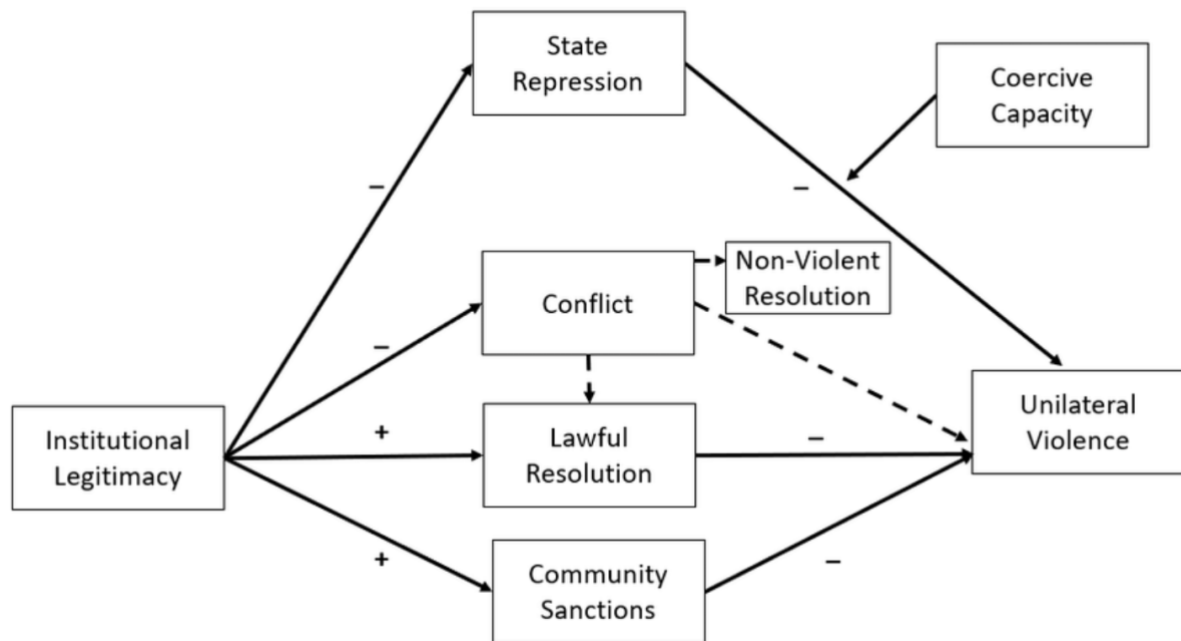
- *Legitimacy theory:*

Similar to stakeholder theory, legitimacy theory claims that companies must act in socially acceptable ways to be successful. This is a problem for businesses, since the changing needs and expectations of society necessitate a response (O'Donovan, 2002). Legitimacy theory justifies the CSR engagement and openness of firms based on their "norms, beliefs, customs, and attitudes" (Hibbitt 2004). In contrast to other theories, legitimacy theory gives a holistic perspective on CSR reporting since it openly acknowledges the social compact that firms are expected and required to embrace in exchange for economic incentives and which secures their survival (Guthrie & Parker 1989; Brown & Deegan 1998).

The existence of enterprises requires adherence to preexisting principles, ethics, and norms. Due to the diversity of economic systems, the degree of these public expectations varies. For instance, the ideals of a socialist society differ significantly from those of a capitalist one (Tilling 2004).

When CSR disclosure is meant to fill a particular legitimacy deficit, legitimacy theory is especially useful for offering an explanation (Branco & Rodrigues 2008). Prior study demonstrates that corporations adjust their CSR policies in reaction to specific events harming the environment and society, such as an oil spill or a gas explosion, which might attract the scrutiny of shareholders and stakeholders (Walden & Schwartz 1997; Deegan et al. 2000).

Figure 4 legitimacy Theory (O'Donovan, 2002).



- **Risk mitigation theory**

The bulk of justifications for CSR are based on its risk mitigation features, and prior research demonstrates a negative link between CSR level and company risk, supporting this risk mitigation theory (e.g., Lee & Faff 2009). According to Krüger (2015), investors have a significantly unfavorable reaction to negative CSR examples, whereas their reaction to positive CSR situations is only modestly positive. This conclusion suggests that a greater degree of CSR is an effective approach for avoiding unfavorable circumstances, despite the fact that CSR does not necessarily result in good returns immediately.

Jo and Na (2012) examine controversial firms, which operate in industries such as alcohol, tobacco, and gambling, and discover that CSR engagement significantly reduces the risk of these so-called sin-companies and that the effect of risk reduction is greater for controversial firms than for noncontroversial firms. As a result, the benefits of CSR commitment are not limited to companies without issues; rather, CSR is an excellent method for companies to manage risks.

Companies whose actions and behavior are irresponsible are more likely to have bad effects such as boycotts, unsatisfied employees, fines and government sanctions, and legal fees, which may also lead to a higher cost of debt (Oikonomou et al. 2014). Businesses have incorporated sustainable practices into their risk management to mitigate the negative impacts of inadequate CSR (Magnanelli & Izzo 2017).

On the corporate debt market, the perspective of risk mitigation is essential for elucidating the potential advantages of responsible behavior. CSR offers protection against unforeseen risks associated with legal, operational, and financial activities; hence, lenders view CSR as a default risk factor. Strong CSR performance is valued by banks and rating agencies because it minimizes credit risk (Bae, Chang & Yi 2018a). Ge and Liu (2015) believe that CSR offers businesses with more stable future cash flows and a better capacity to pay debts as a result of a reduction in the risk of legal action. A number of earlier articles from both the private and public debt markets demonstrate a negative link between CSR and the cost of debt, lending weight to the risk mitigation argument (e.g. Oikonomou et al. 2014; Ge & Liu 2015; Bae et al. 2018a).

2.4 ESG disclosure

In recent years, there has been a growing focus on the ESG performance of companies. Investors, customers, and other stakeholders are increasingly looking beyond financial performance to understand a company's impact on society and the environment. As a result, there has been a rising demand for companies to disclose information about their ESG practices, policies, and performance.

ESG reporting refers to the publication of information about the environmental effects, social practices, and governance structure of a firm. This can include data on greenhouse gas emissions, employee diversity, executive compensation, board composition, and more. By disclosing this information, companies can demonstrate their commitment to sustainability and transparency while also providing investors with a more comprehensive view of their risk profile and long-term prospects.

ESG disclosures can take various forms, including voluntary reporting, sustainability reports, and regulatory filings. The purpose of ESG disclosure is to provide investors and stakeholders

with a more comprehensive view of a company's risk profile and long-term prospects and to promote transparency and accountability. Here are some examples of ESG disclosures that companies may provide:

- Environmental disclosures

A company may report on its environmental impact, including greenhouse gas emissions, energy usage, water usage, and waste generation. For example, a company may provide a sustainability report that outlines its progress in reducing its carbon footprint or transitioning to renewable energy sources.

- Social disclosures

A company may report on its social practices, including issues related to employee diversity, human rights, and community engagement. For example, a company may provide data on its workforce diversity or report on its philanthropic activities in the communities where it operates.

- Governance disclosures

A company may report on its corporate governance practices, including board composition, executive compensation, and shareholder rights. For example, a company may disclose the makeup of its board of directors and its policies on executive pay.

In addition to these broad categories, there are many specific metrics that companies may disclose as part of their ESG reporting, such as:

- Energy intensity (i.e. energy consumption per unit of output)
- Water usage and wastewater management
- Emissions of various pollutants, such as greenhouse gases or toxic chemicals
- Workforce demographics, such as gender and ethnic diversity, and employee turnover rates
- Health and safety performance, such as injury rates or lost workdays
- Supply chain practices, such as supplier diversity or responsible sourcing policies
- Executive compensation practices, such as the ratio of CEO pay to median worker pay

In August of 2019, the Business Roundtable 200 pledged to change their vision of the corporation's duty from serving shareholders to serving stakeholders. In 2020, BlackRock CEO

Larry Fink released a letter to investors outlining the company's commitment to ESG as a new investment standard. However, it is unclear whether corporate leaders will actually serve the interests of broader stakeholders, given that stakeholderism could make corporate leaders more insulated and increase laxity. (Bebchuk and Tallarita, 2020; Kothari, 2001).

2.4.4 Advantages of ESG disclosures

In the last several decades, firms have initiated sustainability initiatives for a number of motives, including moral concerns, "management perks," public pressure, and strategic considerations. (Baron, 2000; Abdi, Li, and Càmara-Turull, 2022). This pushed businesses to include such indicators in their plans and decisions as evidence of their commitment to sustainable practices (Taherdangkoo, Ghasemi, & Beikpour, 2017; Abdi, Li, & Càmara-Turull, 2022). Firms are under pressure to provide an understandable gauge of ecosystem and stakeholder externalities (Abdi, Li, and Càmara-Turull, 2021).

Financial disclosure alone cannot assure a sufficient flow of information to meet the needs of all stakeholders and prospective capital providers (Garca-Sánchez et al., 2020; Salvi et al., 2020a; 2021; Salvi, Vitolla, Raimo, Rubino, & Petruzzella, 2020). For this reason, the voluntary dissemination of non-financial information, specifically ESG information, through corporate documents such as integrated reports, social reports, and environmental reports is gaining importance worldwide (Raimo et al., 2020; Salvi et al., 2020b; Salvi, Vitolla, Raimo, Rubino, & Petruzzella, 2020). According to Tamimi and Sebastianelli (2017), the relevance of ESG disclosure is expanding among organizations due to its power to improve corporate image, firm reputation, and investment decision-making.

In reality, it may be viewed as an essential business activity due to its potential to increase stakeholders' knowledge of waste, pollution, emissions, labor standards, human rights, gender policies, and corporate governance (Raimo et al., 2020; Salvi, Vitolla, Raimo, Rubino, & Petruzzella, 2020). This sort of information is absent from the necessary financial disclosure in this scenario (Jackson et al., 2020; Salvi, Vitolla, Raimo, Rubino, and Petruzzella, 2020). Consequently, accurate ESG disclosure enables investors to evaluate the firm's future performance and the associated risks and opportunities in a transparent and adequate manner (Albarrak et al., 2019; Salvi, Vitolla, Raimo, Rubino, & Petruzzella, 2020).

2.4.4 Measurement of ESG disclosures

ESG measurement is the quantification of a company's performance on ESG concerns. There are a number of approaches that may be used to evaluate the ESG performance of a corporation, including:

- I. Self-assessment: Some organizations may conduct their own ESG evaluations utilizing internal data and metrics and use the results to inform their sustainability strategy and reporting.
- II. Multiple independent rating agencies: such as MSCI, Sustainalytics, and RobecoSAM, assess the ESG performance of businesses. Using their own methodologies and data sources, these organizations analyze the ESG practices of firms and provide scores or rankings.
- III. ESG indices: such as the Dow Jones Sustainability Index and the FTSE4Good Index, are stock market indices that track corporations with strong ESG performance. The inclusion of companies in these indices is decided by a number of parameters, such as their ESG ratings, industrial sector, and market capitalization.
- IV. ESG reporting structures: Several ESG reporting frameworks, such as the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB), provide guidelines for how organizations should report their ESG performance. These frameworks provide defined metrics and reporting standards that organizations may use to report on their ESG operations in a comparable and uniform manner.

In response to the rising demand for trustworthy ESG data and ESG ratings, the market for sustainability ratings has grown substantially and is in a consolidation phase (Escrig-Olmedo et al., 2019). The observed interest is mostly due to the correlation between ESG ratings and firm risk indicators, which reduces information asymmetry (see Utz, 2017). In contrast to credit ratings, ESG measurement is somewhat imprecise due to the lack of a uniform definition, reporting criteria, and comparable characteristics among ESG components and rating providers. However, unlike these metrics, ESG ratings are derived from alternative and competing definitions. In the absence of unified ESG criteria, it is difficult to evaluate a company's sustainability, and in certain cases, it is "unrateable." Windolph (2011) identifies

six impediments to a transparent and objective evaluation, including a lack of standards, a lack of information credibility, bias, trade-offs, a lack of transparency, and a lack of independence. In recent years, ESG rating agencies have not only added new criteria to their assessment models to address emerging global concerns (Escrig-Olmedo et al., 2019), but the assessment criteria are also changing frequently, making the review process even more complex. (Billio, Costola, Hristova, Latino, & Pelizzon, 2021).

2.4.4 ESG rating

ESG ratings are quantitative or qualitative assessments of the ESG performance of a corporation.

Sustainability rating agencies (hereinafter SRAs or rating agencies) are evaluating an increasing number of organizations (Busch, Bauer, & Orlitzky, 2016; Drempetic, Klein, & Zwergel, 2020; Clementino & Perkins, 2021). ESG ratings are frequently produced by third-party providers like MSCI, Sustainalytics, and Institutional Shareholder Services (ISS), which use a range of criteria and methodologies to evaluate the ESG performance of firms. (Clementino & Perkins, 2021)

A corporation with a high ESG grade handles its ESG risks more effectively than its rivals. A company with a poor ESG rating, on the other hand, is comparatively more exposed to ESG risks that are inadequately managed. In addition to ESG reporting, ESG ratings aid investors in comprehending a company's goals and potential future concerns. MSCI ESG is one of the most frequently mentioned ESG grading systems. MSCI examines over 8,500 companies and over 680,000 fixed income and equity products, including ESG funds, throughout the globe. The MSCI ESG score is based on a system that evaluates risk across 10 categories of ecological, social, and governance factors. (Plaut, 2021)

Companies are assessed on 35 major problems relevant to their industry, with the weight of each worry determined by its possible impact and timeframe. The scores are then transformed into an ESG rating ranging from CCC to AAA. ESG ratings can help investors gain a more thorough picture of the long-term health of a firm.

2.4.4 ESG Scores Criteria

The great majority of ESG reports and ratings take ecological, social, and governance factors

into account.

In terms of environmental grading factors, a company's greenhouse gas emissions and animal welfare are considered. Common evaluation criteria include measures of:

- Climate change
- water and soil contamination
- Renewable energy
- Environmental policy

Social score factors, for instance, assess a company's business relationships with its workers, suppliers, partners, shareholders, and other parties throughout the supply chain.

- Are international factory workers treated ethically?
- Are laborers paid an adequate wage for subsistence?
- Are routine safety inspections performed?
- Employees are permitted to take time off for illness and other personal reasons.

Social ratings can also indicate philanthropic contributions, contacts with customers, community effect, and policy influence. Governance evaluation criteria analyze legal and compliance concerns as well as board operations:

- Does the business comply with all local, state, and federal laws?
- Does the makeup of the board reflect a variety of viewpoints and backgrounds?
- How does the company's executive and non-executive remuneration compare to that of its competitors?
- Many ESG scores consider the industry context. Corporate Knights, for instance, solely ranks businesses based on industry-specific success factors. (Farnham, 2020)

2.5 ESG disclosures in Finland

In many places, ESG disclosure is currently voluntary, although there is an increasing trend toward mandated reporting obligations. For instance, the European Union (EU) has recently enacted legislation mandating corporations to report on their ESG practices and risks, and similar measures are under consideration in other countries. As a result, ESG disclosure is gaining importance as a component of corporate reporting, and businesses that fail to address ESG concerns risk falling behind in a developing business environment.

In recent years, ESG aspects have gained prominence in Finland due to a greater focus on sustainability and responsible investing practices. The following are significant events in the history of ESG in Finland:

- I. The Finnish Code of Corporate Governance: The Finnish Corporate Governance Code was established in 2003 and has undergone repeated revisions since then. The code offers listed corporations with advice about problems such as board composition, compensation, and transparency. In recent years, the code has emphasized ESG concerns, such as social and environmental responsibility, more and more.
- II. Finland has been a signatory to the United Nations Global Compact since 2008. The Global Compact is a program that pushes businesses to adopt environmentally and socially responsible policies and practices. As part of the Global Compact, Finnish businesses are obliged to report on their progress toward sustainability targets and demonstrate their commitment to ethical business practices.
- III. The Finnish Sustainable Investing Forum (FINSIF) is a non-profit organization that was founded in 2001 to encourage sustainable investment practices in Finland. FINSIF represents a variety of stakeholders, including investors, asset managers, and service providers, and provides a forum for the exchange of information and best practices.
- IV. The National Pension Fund of Finland (VER): The VER is a state-owned pension fund that administers assets for the government of Finland. The VER has been a pioneer in ESG investing in Finland, focusing on ethical investment techniques and the development of long-term wealth. Additionally, the VER has actively promoted sustainability and responsible investment practices among other institutional investors in Finland.

- V. The Sustainable Finance Action Plan of Finland: The Finnish government announced a Sustainable Finance Action Plan in 2019 in an effort to encourage sustainable investment and finance practices in Finland. The action plan includes initiatives to assist in the development of sustainable financial products and services and to enhance ESG transparency and reporting.

In recent years, the application of ESG elements in Finland's publicly traded enterprises has gained speed, yet there is still potential for improvement. Here are some key developments and trends in Finland's listed companies' ESG implementation:

- I. Increased ESG disclosure: In recent years, Finnish firms have improved their ESG disclosure procedures, with many releasing sustainability reports and other ESG-related information. The Financial Supervisory Authority (FIN-FSA), the Finnish financial regulator, released new ESG disclosure standards for listed firms in 2020, with the intent of enhancing the comparability and openness of ESG information.
- II. Increasing demand for ESG investments: In Finland, the demand for ESG investment products has increased as more investors attempt to include ESG aspects into investing decisions. According to a poll conducted by the Finnish Sustainable Investment Forum (FINSIF) in 2020, approximately two-thirds of institutional investors in Finland consider ESG aspects when making investment decisions.
- III. Incorporation of ESG factors into business strategy: Numerous Finnish businesses are currently incorporating ESG factors into their overall business strategy and decision-making processes. Several Finnish companies, for instance, have established ambitious sustainability goals, such as reducing their carbon emissions and increasing their use of renewable energy.
- IV. ESG rankings and evaluations: Third-party providers, such as MSCI, Sustainalytics, and the Dow Jones Sustainability Index, are increasingly evaluating and ranking Finnish firms according to their ESG performance. Some Finnish companies have also been recognized for their ESG performance in international rankings, such as the Global 100 Index, which ranks the most sustainable companies in the world. companies like Neste, Kone, Outotec, and UPM.

2.6 Background review

As information production and reporting are costly endeavors, businesses may disclose CSR information for a variety of reasons. In addition, the laws governing mandatory and voluntary CSR disclosure differ greatly from nation to nation. Researchers have offered a variety of theoretical viewpoints on CSR disclosure. Several studies, for example, have suggested that companies engage in CSR disclosure to increase their legitimacy in the eyes of external stakeholders. Institutional theory posits that social constraints constrain an organization's activity (Gray, Kouhy, & Lavers, 1995; Ma, Zhang, Zhong, & Zhou, 2020).

Therefore, organizations strive ceaselessly to ensure that society's stakeholders view their activities as "legitimate." Luo et al. (2017) discovered that companies with institutional linkages to the central government submitted CSR reports more quickly and of higher quality in response to the central government's demands than firms without such ties. In addition, businesses in Chinese provinces where economic growth is a greater priority for the local government tend to file CSR reports more slowly and of poorer quality. Zhang, Marquis, and Qiao (2016) demonstrated that businesses with bureaucratically connected executives were less likely to use donations to combat government pressure than those with politically connected executives.

In addition, research indicates that companies with higher social exposure are more likely to engage in CSR disclosure. For example, Alsaeed (2006) demonstrated that a firm's visibility (as measured by firm size) influenced the level of information provided in its non-financial reports, and Branco and Rodrigues (2008) discovered that companies with greater public visibility were expected to be more concerned with improving their corporate image through social responsibility disclosure. (Ma, Zhang, Zhong, & Zhou, 2020)

Stakeholder theory acknowledges the duty of managers to decide whether to engage in CSR. For example, Donaldson noted that "stakeholder theory is managerial in nature" and that "managers are the subject of stakeholder theory" (1999). However, the theory continues to view CSR as a response to external pressure exerted by a variety of stakeholders. Managers, according to this idea, respond selectively to external forces rather than acting in line with their own values and inclinations.

This explanation may not be suitable within the context of social response. The ideas and attitudes of top managers are essential to the creation of strategy because they motivate managers to adopt either proactive or reactive approaches to satisfying societal demand. (Ma, Zhang, Zhong, & Zhou, 2020). Ullmann (1985) stated that a company's key decision-makers may hold various views on society's requirements and respond to these needs in a variety of ways. Their favorable position reflects their efforts to influence their organizations' ties with important stakeholders. A negative posture indicates that a corporation neither monitors nor pursues the optimal stakeholder approach. (Ma, Zhang, Zhong, & Zhou, 2020)

Consistent with stakeholder theory (Freeman, 1984), a number of scholars have asserted that CSR is positively related to corporate financial performance because it helps organizations manage the relationships with stakeholders and reduce conflicts of interest among the multiple stakeholders (van Beurden & Gossling, 2008; D'Amato & Falivene, 2020). In addition, this approach allows the organization to create a balance between attaining economic goals and creating wealth (Garriga & Melé, 2004, D'Amato & Falivene, 2020).

Participation in CSR results in the formation of moral capital and the avoidance of negative stakeholder assessments and corporate sanctions (Godfrey, 2005). It also decreases the risk of unfavorable regulatory, legislative, and budgetary action (Freeman, 1984; (D'Amato & Falivene, 2020). In particular, the probable end of litigation minimizes flow volatility, so freeing up greater capital for strategic investments (Sharfman & Fernando, 2008).

It is common knowledge that transparency reduces information asymmetry (Leuz and Verrecchia 2000; Lambert et al. 2007) and that reduced information asymmetry leads to smaller bid-ask spreads (Elliott and Jacobson 1994). In a similar vein, voluntary disclosure reduces investors' non-diversifiable estimate of risk (Botosan, 1997), which correlates to a drop in capital costs (Lambert et al., 2007; Kothari et al., 2009; Michaels & Grünbaum, 2017).

New Institutional Economics posits that high-performing organizations use transparency to transmit non-replicable signals of better performance to avoid an adverse selection problem (Verrecchia 1983). Without reliable disclosure signals, market liquidity declines (Akerlof 1970; Kyle 1985). Prior to capital expansions, firms improve their voluntary disclosure signals, according to an empirical study (Michaels & Grünberg, 2017).

Vitolla et al. (2019); Nicol et al. (2021). In fact, financial disclosure alone cannot guarantee a

sufficient flow of information to meet the needs of the numerous stakeholders and potential capital providers (García-Sánchez et al., 2020; Salvi et al., 2020; 2021). (Antonio Salvi, Petruzzella, Raimo, & Vitolla, 2022). Therefore, the voluntary dissemination of non-financial information, particularly ESG information, through corporate documents such as integrated reports, social reports, and environmental reports is gaining international significance (Raimo et al., 2020; Salvi et al., 2020b).

According to Tamimi and Sebastianelli (2017), the relevance of ESG disclosure is expanding among organizations due to its power to improve corporate image, firm reputation, and investment decision-making. Due to its ability to increase stakeholders' knowledge of waste, pollution, emissions, labor standards, human rights, gender policy, and corporate governance, it may be seen as a critical business activity (Raimo et al. 2020). This sort of information is absent from the required financial disclosure in this regard (Jackson et al., 2020). Therefore, accurate ESG disclosure enables investors to assess the firm's future performance and the associated risks and opportunities in a transparent and adequate manner (Albarrak et al., 2019; Antonio Salvi, Petruzzella, Raimo, & Vitolla, 2022).

3 ESG and COEC

The cost of equity capital is a fundamental indicator used in finance to determine the expected return that investors demand in order to purchase common shares. It is the recompense investors seek for the risk they take by investing in a specific firm. Historically, the cost of equity capital has been largely determined by financial measurements and market considerations. In recent years, however, the importance of ESG considerations as a predictor of the cost of equity capital has grown.

Investors are recognizing that excellent ESG performance is a sign of successful risk management, reputation preservation, and resilience in the face of developing social and environmental concerns. Consequently, the incorporation of ESG factors into the cost of equity capital analysis enables a more thorough evaluation of the underlying risk profile and growth potential of a firm.

3.1 Importance of ESG disclosures for investors

Globally and nationally, ESG management has emerged as a key societal concern. Numerous investors seek out firms that meet their ESG criteria, and authorities in numerous nations are drafting new regulations or laws. Consulting businesses and private organizations are disseminating ESG models that represent various features of specific nations. However, there is no uniform ESG framework that stakeholders have agreed upon, and academic research on country-specific ESG models is still absent. (Park & Jang, 2021)

In the future, shareholders would want the company to have stronger economic performance and be more sustainable. Matos et al. (2020) observed that sustainable companies had a greater likelihood of steady dividend payments. Sustainable firms have better long-term ties with stakeholders besides shareholders. A number of studies in the current literature imply that investments in firms with strong ESG practices have a greater return on investment and that outstanding ESG management in corporations can proactively avert abrupt shocks to cash flows (Lee et al. 2013). Friede et al. (2015) examined ESG/SRI research and discovered a substantial positive correlation between ESG performance and financial performance. (Park & Jang, 2021)

Investor interest in ESG and CSR is demonstrated by the fact that in 2019, 300 mutual funds with ESG mandates attracted a total of \$20 billion in net flows, which is four times the 2018 figure. (Hale & CFA, 2020) In addition, more than 3000 institutional investors and service providers have joined the Principles of Responsible Investment (PRI), a commitment to include ESG and CSR problems in their investment research and decision-making. The amount of assets managed by these investors has risen from \$6.5 trillion in 2006 to over \$86 trillion in 2019. (Gillan, Koch, & Starks, 2021)

3.1.1 ESG and firms' transparency

According to research by Yu, Guo, and Van Luu (2018), investors may benefit from considering ESG transparency as a kind of non-financial data. In line with Cheng et al. (2014), they show that more ESG disclosure may reduce investors' information symmetry and agency costs. Based on their research into the factors that influence whether a company discloses information about ESG and environmental issues, Yu, Guo, and Van Luu (2018) conclude that larger firms, those with fewer insider holdings, a lower proportion of institutional investors, better liquidity (current ratio), and a higher R&D intensity, are more likely to do so.

In order to encourage thorough reporting, Yu, Guo, and Van Luu (2018) suggest that policymakers and regulators use mandatory or voluntary disclosure mechanisms. More ESG openness requires cooperation between businesses, stock exchanges, security agencies, investors, and corporate reporting groups like the Sustainability Accounting Standards Board and the Global Reporting Initiative. There are caveats to this work that might motivate additional research. Although Yu, Guo, and Van Luu (2018) explore the quantity of ESG disclosure data, the quality of ESG disclosure is still an open question.

ESG adoption by companies is influenced by a number of variables and potential outcomes. To begin, management may elect to use ESG as a strategic option. Improvements in firm value and sustainability (Freeman 1984), differentiation and cost savings (Porter et al. 2019), employee engagement at work (Agarwal et al. 2012), employee productivity (Park 2020), and customer loyalty may all result from a company's efforts in sustainability (Park, 2020; Kim and Park 2017; Park & Jang, 2021; Bhimavarapu, Rastogi, Gupte, Pinto, & Shingade, 2022).

It is the corporation's obligation as a member of society to implement ESG, whether or not it is required to do so by law or regulation. Even if a company's adoption of ESG disclosures doesn't automatically make it morally upright, it will likely make more ethical choices overall. ESG rating agencies and other financial institutions might be seen as catalysts for change in the way businesses are run (Escrig-Olmedo et al., 2019; Park & Jang, 2021).

Last but not least, there is a possibility that stakeholders may benefit from a company's adoption of ESG. Institutional investors are paying more attention to ESG for two main reasons. To begin, ESG investing is a proactive defender of ethical investment methods. Second, ESG investments are seen as a means to improve the efficiency, profitability, and safety of professionally managed investment portfolios (Broadstock et al., 2021; Park & Jang, 2021).

3.1.2 ESG and investors' risk management

Investors would like to see the firm improve its economic performance and become more sustainable in the next few years. According to Matos et al. (2020), sustainable businesses are more likely to maintain their dividend payments. Long-term relationships with stakeholders outside of shareholders are strengthened at sustainable companies. Investments in companies with good ESG practices have been shown to provide higher returns, and companies with exceptional ESG management are better able to anticipate and forestall negative impacts on their cash flow. Studies of ESG and SRI research have shown a strong positive association between ESG performance and financial success (Lee et al., 2013; Friede et al., 2015).

According to research (Park & Jang, 2021) Management, employees, supply chain partners, and even consumers may all benefit from ESG if it helps with risk and opportunity management. New companies are more vulnerable to the negative effects of corruption on their profitability and stock price (Nam et al., 2020). (Thakur et al. 2019). Managing risks might be a preventative measure to improve a company's long-term viability (Jo and Na 2012). Costs are reduced when issues are dealt with or avoided thanks to effective management (Swanson 1999).

The company's image should also be considered while assessing potential dangers. When comparing the impact of ESG-related controversies on the performance of stocks and portfolios, Franco (2020) found that portfolios with serious ESG controversies or lowered

ESGs fared relatively poorly. This was true even when controlling for the severity of the underlying offense (Song and Han, 2017). Recent research has shown that highly sustainable businesses are less vulnerable to risk and more resilient to volatility. Companies with poor ESG profiles owing to excessive carbon emissions have a higher tail risk, according to research by Ilhan et al. (2021). Financial and non-financial U.S. enterprises with high ESG ratings outperformed those with lower ratings, according to studies spanning the time period of the global financial crisis (Cornett et al., 2016, Park & Jang, 2021).

3.2 Cost of equity capital (COEC)

3.2.1 Definition and measurement

The COEC refers to the rate of return needed to entice investors to put money into a project. An investor will not put cost into an asset if there is a better alternative available, and this is what economists mean by the "cost of capital." For example, (Pratt & Grabowski, 2008)

The word "market" is used to describe the totality of potential backers for a venture. Financial backing often takes the form of hard currency, although non-monetary assets may also suffice. The cost of capital is often represented as a percentage of the total amount invested; this percentage represents the yearly dollar amount the investor needs or expects to realize.

In this sense, "capital" refers to the many elements that make up a company's financial backing. Capital structures are made up of the following major elements:

- Debt capital
- Favored equity (stock or partnership interests with preference features, such as seniority in receipt of dividends or liquidation proceeds)
- Common equity (shares of stock or partnership interests at the lowest or residual level of a company's capital structure) (Pratt & Grabowski, 2008)

It is difficult to put a cost on equity capital since there are no obvious value drivers. Paying out dividends is, at most, a promise to do so, since they do reflect the volume and timing of cash flows. However, unlike with bonds and metrics like yield to maturity, there is no clear way to evaluate the expected return on a stock. Prospective stock investors must assess the size,

timeliness, and volatility of future cash flows. This makes valuing stocks far more challenging than valuing debt. Reference: Mauboussin & Callahan (2015)

Typically, methods for determining the cost of equity capital are based on a pricing model for assets. Among financial executives and investors, the capital asset pricing model (CAPM) is the most prevalent. 4 The CAPM has been criticized in recent decades despite its widespread use. The focus point is beta, which aims to quantify risk by assessing the sensitivity of a stock's returns in relation to market returns. Beta predicts real rewards ineffectively. In an effort to properly represent the link between risk and return, academics have incorporated additional variables. Mauboussin & Callahan (2015)

A group of economists led by William Sharpe developed the capital asset pricing model (CAPM); finance professors Eugene Fama and Kenneth French suggested the three-factor model. "Capital Is" (1964). A Nobel Memorial Prize in Economics was awarded to both Sharpe and Fama.

In an attempt to better explain returns than the CAPM or the three-factor model, academics have continued to add components. As a consequence, there is now a veritable "zoo" of components that purport to explain a wide variety of supposed anomalies. Hou, Xue, and Zhang (2019)

However, the investment industry, led by quantitative funds, often only uses six components, despite the CAPM's widespread use among financial executives. A few examples are that stocks of companies with high betas generate higher returns than stocks of companies with low betas, that stocks of companies with small capitalizations generate higher returns than stocks of companies with large capitalizations, that stocks with low multiples outperform those with high multiples, and that stocks with positive momentum (those that have performed well in the past continue to perform well in the short term) generate higher returns than stocks of companies with low betas (companies with low asset growth outperform those with high asset growth). As of right now, Fama and French recommend a five-factor model that includes everything except momentum.

Investment returns are estimated using the Capital Asset Pricing Model (CAPM), which involves multiplying the risk-free rate by the asset's beta and the equity risk premium (ERP). In the same way that a credit spread represents the difference between an interest rate and a risk-free rate, ERP represents the gap between the market's anticipated return and the risk-free rate. In 2015, Mauboussin and Callahan found that

$$\text{Expected return} = \text{Risk-free rate} + \beta(\text{Market return} - \text{Risk-free rate})$$

ERP is the same for all equities in the CAPM because it measures "systematic risk," or risk that cannot be eliminated via diversification. Beta gauges the contribution of a company's risk to portfolio risk. "Unsystematic risk" can be mitigated by diversifying a portfolio.

3.2.2 Importance of COEC for investors

The COEC is crucial to investors for a number of main reasons:

- I. **Investment Decision-making:** The COEC is a crucial factor in making investment decisions. Investors evaluate prospective investments by comparing the anticipated return to the needed return, which is represented by the cost of equity capital. It assists investors in determining if a particular investment opportunity provides adequate profits to compensate for the associated risk.
- II. **Risk Assessment:** The COEC represents the investment's inherent risk. This indicator is used by investors to evaluate the riskiness of a company or project. A greater cost of equity capital is indicative of a higher perception of risk, whereas a lower cost of equity capital is indicative of a lower perception of risk. By evaluating the cost of equity capital, investors may match their risk tolerance with the most suitable investment options.
- III. **Portfolio Diversification:** COEC is a crucial factor in portfolio diversification. Investors seek to construct diversified portfolios that strike a balance between risk and reward. Investors can diversify their risk exposure across diverse sectors, industries, and locations by combining assets with varying degrees of equity capital cost.

- IV. Valuation: The COEC is a fundamental part of firm valuation models such as discounted cash flow (DCF) analysis. The cost of equity capital is utilized by investors to discount future cash flows and determine the current value of an investment. Accurate valuation is essential for making educated investment decisions and evaluating a company's stock's fair value.
- V. Performance Evaluation: Investors use the cost of equity capital as a benchmark for assessing the success of a firm. Investors can determine if a firm is making sufficient returns for its shareholders by comparing its return on equity to its cost of equity capital. This examination helps find high-performing businesses and investment prospects.
- VI. COEC Comparison: To analyze the total COEC structure, investors compare the COEC to the cost of other forms of capital, such as debt and preferred stock. This comparison facilitates investors' comprehension of the company's capital allocation strategies and their possible influence on shareholder returns.

3.3 How ESG can affect cost of equity capital

ESG concerns are now recognized as significant determinants of the cost of equity financing. The inclusion of ESG factors in the evaluation of a company's risk profile and development potential may have a substantial influence on investors' expected and necessary returns. The influence of ESG factors on the cost of equity capital is enumerated below:

- I. Risk Perception and ESG Performance: A company's ESG performance might impact investors' risk assessment. Companies with strong ESG practices are frequently seen to have superior risk management, operational efficiency, and resilience. Consequently, they may be perceived as less hazardous investments, resulting in a lower necessary return on equity and ultimately a decrease in the cost of equity capital. Positive ESG performance indicates a company's dedication to tackling environmental and social concerns, which may boost long-term wealth generation and minimize risks.

- II. **Investor Preferences and Demand:** The rising demand among investors for sustainable and ethical investments has substantial effects on the cost of equity capital. Strong ESG performance is more likely to attract a larger investor base, including individuals who desire to align their investments with their beliefs. Increased demand for these firms' shares can result in higher share prices and perhaps cheaper equity capital costs. In addition, if sustainable investment becomes more prevalent, organizations with poor ESG performance may incur increased capital expenditures due to waning investor interest.

- III. **Access to Capital:** Additionally, ESG considerations might impact a company's access to funding. Increasingly, investors, particularly those with a focus on sustainable investing, are incorporating ESG factors into their investment decisions. Companies with superior ESG practices may have increased access to finance, such as through participation in ESG-focused funds or advantageous conditions from socially responsible investors. This increased access to financing may result in a decrease in the cost of equity capital for these businesses.

- IV. **Regulatory Environment and Stakeholder Expectations:** The regulatory environment and changing stakeholder expectations have a substantial impact on the equity capital cost. Governments and regulatory agencies impose ESG-related criteria, such as carbon emission reduction objectives and diversity and inclusion efforts, with growing frequency. Failure to achieve these expectations may result in financial fines or reputational harm, which can raise a company's risk profile and equity capital costs. In contrast, organizations that handle ESG concerns proactively may benefit from regulatory incentives or good stakeholder perception, resulting in a potential reduction in the cost of equity capital.

3.4 Historical review

In accordance with the objective of this study, the literature evaluation focuses on the link between ESG disclosure and the COEC. Dhaliwal et al. (2011) discovered that the spread of sustainability information contributes to a decrease in COEC. Dhaliwal et al. (2014) expanded their research on the same twenty-three industries and verified the negative association between sustainability disclosure and the COEC, noting that this relationship is particularly prominent for stakeholder-oriented enterprises.

Plumlee et al. (2015) analyzed the link between environmental disclosure and the COEC using a sample of US enterprises working in the oil and gas, food and beverage, chemical, electric utilities, and pharmaceutical industries. The results revealed a negative correlation between the amount of environmental disclosure and the COEC. Michaels and Grüning (2017) analyzed a sample of 264 German public businesses from various industries and found a negative correlation between CSR disclosure, information asymmetry, and the COEC. Albarrak et al. (2019) analyzed the effect of carbon footprint disclosure on the cost of financing using a sample of enterprises from various industries, finding a negative association.

Chen et al. (2023) examined 1,532 Chinese listed businesses between 2010 and 2020 and concluded that ESG disclosure reduces the COEC. In contrast, Clarkson et al. (2013) examined five distinct sectors (pulp and paper, chemical, oil and gas, metals and mining, and utilities) and discovered that the impact of environmental information on the COEC is not statistically significant. In addition, by analyzing social disclosure, Richardson and Welker (2001) discovered a positive correlation between social information and the COEC, indicating that wide social disclosure boosts the COEC.

Shifting the focus to sectoral research, Raimo et al. (2020) evaluated the link between ESG disclosure and the COEC on a sample of food and beverage industries, discovering a negative correlation between ESG information and the COEC. Chen, Li, Zeng, and Zhu, (2023) evaluated the impact of environmental protection, social responsibility, and corporate governance (ESG) performance on the cost of equity capital (COEC) of Chinese A-Share businesses from 2010 to 2020.

They observed that ESG can not only cut the cost of equity capital directly, but also indirectly, by reducing the market risk of businesses and boosting their equity diversity. Analyzing the influence of ESG disclosure on the cost of equity capital in the H&T business, Raimo, Petruzzella, Salvi, and Vitolla (2024) establish a negative association between ESG disclosure and the cost of equity capital. Raimo, de Nuccio, Giakoumelou, Petruzzella, and Vitolla, 2020 investigate the impact of ESG disclosure on the cost of equity capital in the food and beverage (F&B) industry and find a significant negative relationship between ESG disclosure and the cost of equity capital.

4 Hypothesis development

Research initiatives are frequently driven by a series of questions that seek to unravel the complexities of a particular occurrence. This is done in the name of gaining information and understanding. These research questions constitute the basis for an in-depth examination, but in order to translate them into statements or hypotheses that can be tested, a strategy that is laser-focused and methodical is required. The formulation of hypotheses is the method that is utilized to complete this necessary stage.

Because it helps to bridge the gap between research questions and empirical analysis, the chapter that is dedicated to the process of developing hypotheses is an essential part of this journey through the research. Researchers are able to develop valuable insights and contribute to the existing body of knowledge as a result of their ability to generate hypotheses, which provide a clear framework and direction for the investigation.

In statistical studies, it is common practice to generate two hypotheses, or alternative outcomes. $H(0)$ is the "null hypothesis," which states that the sample does not include any occurrences of the phenomena of interest. However, the phenomenon under examination is assumed to be present in the sample under the alternative hypothesis $H(1)$. This is because the hypothesis is based on evidence from the outside world. The links between diverse types of events are the primary subject of scientific hypotheses. The findings of earlier studies are used to inform the hypotheses and assumptions developed in this chapter.

4.1 Hypothesis

The ways in which disclosure affects the cost of equity capital are analyzed in some of the research that is being done in this area. The ability of information sharing to lower the level of investor uncertainty and the consequent risk values has been highlighted in a number of studies that have been conducted in the past (Barry and Brown, 1984; Coles et al., 1995; Brown and Dacin, 1997; Lambert et al., 2007). Disclosure's ability to mitigate information asymmetries between the company and investors is the focus of a second body of research (Diamond and Verrecchia, 1991; Baiman and Verrecchia, 1996; Verrecchia, 2001; Easley and O'Hara, 2004; Arvidsson, 2011; Giacosa et al., 2017; Garca-Sanchez and Noguera-Gamez, 2017; Vitolla et al., 2017; The ability of information to lessen the monitoring costs incurred by investors is one

additional channel that has been suggested by the research that has been done, and this capability is related to a lower projected rate of return for the investors' investments (Lombardo and Pagano, 2002). Last but not least, it has been found that disclosing a larger amount of information is associated with a greater proportion of investors who hold positions of longer duration (Merton, 1987; Lombardo and Pagano, 2002; Raimo et al., 2020).

Researchers have found conflicting outcomes, despite widespread agreement among academics that more openness increases the COEC (Core, 2001; Healy and Palepu, 2001; Kothari, 2001; Botosan, 2006; Zhou et al., 2017). Numerous variables outside of information exchange may impact the COEC, as detailed in the literature. Three of these are the presence of financial incentives (Zhou et al., 2017), the frequency and type of information shared (Botosan and Plumlee, 2002; Kothari et al., 2009), and the absence of relevant control variables (Francis et al., 2005; Chen et al., 2009; Hail and Leuz, 2009; Zhou et al., 2017). (Raimo et al., 2020).

The above-mentioned considerations about the cost of equity capital should also be applied to ESG disclosure.

Disclosure of ESG issues can have an impact on the cost of equity capital in a number of ways. One of these is through the reduction of informational disparities that exist between companies and investors. This, in turn, leads to reduced investor uncertainty and better risk valuations. When seen from this angle, it is clear that ESG disclosure can help to minimize asymmetries by supplying information that is not covered by financial disclosure. This is further supported by the fact that investors have been paying a greater amount of attention to ESG disclosure in recent years (Tamimi and Sebastianelli, 2017; Vitolla et al., 2019c; Raimo et al., 2020).

Similarly, research emphasizes how investors can evaluate a company's risks, possibilities, and transparency when all ESG factors are considered and represented (Ng and Rezaee, 2015; Yu et al., 2018; Albarrak et al., 2019; Raimo et al., 2020). Disclosure can have an effect on the COEC using the same procedures as are applicable to disclosure of ESG factors.

It should come as no surprise that investors are becoming increasingly worried about social, environmental, and governance issues. ESG information has the ability to lessen the uncertainty that these investors feel. Further allowing for the reduction of information gaps between organizations and investors, an accurate representation of ESG performance is essential (Raimo et al., 2020). In fact, ESG information is not included in financial disclosure,

and as a result, information regarding material risks and values is not adequately covered by the former, leaving room for ESG disclosure policies (Michaels and Gruning, 2017; Tamimi and Sebastianelli, 2017). In addition, ESG disclosure enables investors to accurately evaluate corporate transparency, opportunities, and most importantly, the risks associated with business activity (Albarrak et al., 2019; Ng and Rezaee, 2015; Yu et al., 2018; Yu et al., 2019; Albarrak et al., 2019; Yu et al., 2018; Albarrak et al., 2019; Rimo et al., 2024).

Efforts made by businesses to be environmentally responsible may lower both market and operational risk; investors particularly value these efforts (Chen et al., 2023). Disclosure of ESG issues, in particular, can lower the collapse risk specific to enterprises.

- I. an increase in the amount of information that is made available to shareholders by companies
- II. giving shareholders with pertinent information (for example, information about litigation risks and concerning environmental and social liabilities)
- III. making it more difficult for employees to steal from the company.
- IV. speeding the process of the business model's change (da Silva, 2022; Raimo et al., 2024).

"Businesses that disclose CSR have fewer bad press reports and lawsuits and obtain more government subsidies," write Chen and Xie (2022, p. 3). These results were supported by the findings of He et al. (2022), who showed that corporations can mitigate idiosyncratic risk through ESG involvement by increasing the quantity of non-financial information they provide to investors. Last but not least, ESG disclosure broadens the pool of prospective long-term investors. Most investors consider ESG disclosure important for future investment returns, as shown by Amel-Zadeh and Serafeim (2018). Furthermore, corporations can increase the number of long-term investors at the expense of opportunistic ones through greater ESG disclosure standards, as stated by Kotsantonis et al. (2016). This was found to be the case (Raimo et al., 2024).

One would expect a decrease in the cost of equity capital due to the positive effects of ESG disclosure on investor confidence, information asymmetry, risk assessment, and the allure of long-term investors. The H&T sector, which is characterized by substantial knowledge asymmetries, may have the same problem (Crane and Jackson, 2000; Raimo et al., 2024). This

thesis is predicated on the notion that ESG disclosure provides investors with valuable information regarding a company's sustainability practices, environmental performance, and social responsibilities. When companies proactively publish ESG information, they demonstrate their commitment to tackling ESG challenges and capitalizing on opportunities associated with these concerns. This may lead to a reduction in the perceived degree of risk by investors, resulting in a drop in the cost of equity capital.

The second hypothesis (H2), which builds on the previous hypothesis (H1), analyzes the possibility that the relationship between ESG disclosure and the cost of equity capital (COEC) varies depending on the type of firm being researched. Hypothesis 2 claims, in particular, that the association between COEC disclosure and ESG disclosure is much higher in industrial organizations than in other categories of firms. Industrial businesses that operate in fields that have significant negative environmental consequences face increased scrutiny from stakeholders over their ESG strategies.

ESG factor disclosure by industrial companies can have particularly significant ramifications because it provides investors with critical insights into a company's ability to successfully manage ESG risks and seize opportunities in industries that naturally present environmental challenges. This type of disclosure can also serve as proof of conformity with environmental regulations and dedication to sustainable practices, alleviating concerns about legal action, reputational harm, and additional costs.

Other types of organizations, on the other hand, such as those focused on providing a service or on technology, may have significantly different risk profiles and ESG risks. While ESG factors are still relevant to these companies, their operations may have a smaller environmental impact than industrial companies. As a result, it is probable that these companies' disclosure of ESG features will have a relatively low impact on their COEC.

H2 conducts an analysis of the varying impacts of ESG disclosure on the COEC across various types of firms in order to provide insights into the specific contexts where the association between ESG disclosure and the COEC is most pronounced. This investigation will be conducted to provide these insights. These findings will add to the existing body of knowledge on sustainable finance and corporate social responsibility.

They will also help investors, politicians, and practitioners understand the subtleties and implications of ESG disclosure across a number of businesses and sectors. Following an investigation in the first half of the year into the varying effects of ESG disclosure on the cost of equity capital (COEC) for various business types, the focus is now shifting to the evolution of the link between ESG disclosure and COEC through time. The third hypothesis (H3) claims that the strength of this association has increased over time, reflecting a shift in how markets are perceived and how investors behave.

In recent years, there has been a discernible shift in the landscape of investment towards a stronger emphasis on sustainability and corporate social responsibility. Due to the recognition that environmental, social, and governance (ESG) issues can have a substantial impact on a company's financial success, investors are demanding greater transparency and disclosure regarding ESG practices and performance. Increasing awareness of the risks and possibilities linked to environmental, social, and governance aspects has been the impetus for ESG's growing importance.

The disclosure of environmental, social, and governance aspects has been significantly aided by regulatory agencies and industry organisations. As a result of the importance of standardized reporting, frameworks such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-related Financial Disclosures (TCFD) have been established. In addition to encouraging firms to publish relevant ESG information in a consistent and comparable manner, these frameworks also provide guidelines on how to do so.

Investors now have access to a variety of information regarding a company's sustainability policies, environmental effects, social activities, and corporate governance as a result of firms implementing ESG disclosure rules. Due to the availability of this detailed and standardized information, investors may now examine the risks and opportunities connected with a company's ESG performance. In response, investors have included ESG (environmental, social, and governance) considerations in their investment selections. These investors have made this decision because they recognize the potential financial advantages of sustainable practices over the long term.

Investors are more aware of the impact that ESG disclosure has on a company's COEC as a result of the increasing demand for ESG disclosure and the incorporation of sustainability problems into investment strategies. They now take into account a company's capacity to effectively manage environmental, social, and governance (ESG) risks, capitalize on ESG-related opportunities, and fulfill expanding stakeholder expectations. As a result, the relationship between ESG disclosure and the COEC has strengthened over time, mirroring evolving market perspectives and investor preferences.

H3 wants to contribute to the current corpus of research on sustainable finance and corporate social responsibility by analyzing the evolving linkages between ESG disclosure and the COEC. This study's findings will provide valuable insights into the shifting landscape of investor behavior and market valuations, shed light on the growing importance of ESG disclosure as a driver of investor decision-making, and ultimately influence the cost of equity capital for companies operating in a wide variety of industries and sectors. Considering the foregoing, we propose the following hypothesis:

H1: Disclosure of the ESG factors has a negative impact on the cost of equity capital (COEC).

H2: The association between the ESG disclosure and the cost of equity capital (COEC) stronger in industrial firms than in other firms.

H3: The association between the ESG disclosure and the cost of equity capital (COEC) has become stronger over time.

5 Research design and methodology

The methodology chapter is responsible for describing the study design and processes employed, and it plays a crucial role in ensuring the reliability and validity of the research's conclusions. This introduction will provide a review of the most significant issues covered in this chapter. Included in these subjects are research methods, sample selection and data collection, variables, models, and sensitivity tests. By delving deeper into these factors, we are able to establish the authenticity and validity of the research. By examining each component, we will gain a better understanding of the overall methodology employed in this study.

The first section of this chapter is devoted to a discussion of the methodology employed in this paper, as well as its alignment with the study objectives. It emphasizes the significance of selecting an appropriate sample and collecting important data in order to effectively address the research problem. Then, we will proceed to describe the model's variables, including the dependent, independent, and control variables. This examination illuminates the major factors that played a function in determining the research findings.

In addition, this chapter focuses mostly on the approaches applied in the analysis of the data. It describes the analytical approaches and models used and demonstrates how they contributed to the data interpretation and analysis. In addition, the chapter acknowledges the importance of performing delicate testing to evaluate the robustness and dependability of the findings.

We ensure the validity of the research procedure by paying close attention to these key factors and addressing them in the methodology chapter. This chapter provides a comprehensive framework that facilitates the reader's comprehension of the methodology employed to address the research problem and attain the research objectives.

5.1 Sample selection and data collection

The firms that have ESG disclosure data and for which it is possible to calculate COEC were chosen to make up the sample from among all of the companies that were listed on the NASDAQ HELSINKI between the years 2003 and 2022.

In total, 74 different Finnish businesses were chosen, and the data sample has a total of 405 different observations (since in calculation of COEC we have to use eps_{t+1} and eps_{t+2} our ESG observation were limited to between the years 2003 and 2020. Furthermore, the data was acquired from the Refinitiv database, which is located at the Oulu Business School.

5.2 Variables

Variables play a crucial role in research studies since they are the fundamental building blocks for analyzing and interpreting patterns, correlations, and effects. In this section of the chapter devoted to the methodology, we examine the many types of variables employed in this study, including dependent factors, independent variables, and control variables. It is essential to comprehend these variables in order to comprehend the factors that contribute to the research findings.

This section begins with an examination of the dependent variables, which represent the most significant features of interest in the study. Since these outcomes or effects are being investigated or measured, these variables are designated as such. They are indications of the changes or variations that occur directly as a result of the independent variables, and research on them provides insight into the research questions or hypotheses.

Next, we examine the independent variables, which are those that the researcher chooses to manipulate or measure. These are the variables that are under the researcher's control, and it is believed that they have an effect on the dependent variables. By evaluating the variables that are deemed independent, we can determine the influences or causes of changes in the variables that are considered dependent.

Moreover, we consider the feasibility of including control variables in the research design. During an analysis, "control variables" are factors that are held constant or controlled for in order to isolate the specific effects of the independent variables on the studied variables (the "dependent variables"). They contribute to ensuring that the observed relationships are neither confounded nor influenced by non-study-related variables.

5.2.1 Dependent variables

The COEC is serving as this study's representative of the dependent variable. It is a measurement of the rate of return that investors require in order to purchase and continue holding shares in their investment portfolio. This criterion is determined by the level of risk that financial markets and investors consider to be associated with future cash flows (Atan et al., 2018; Witmer and Zorn, 2007). According to Bui et al research (2020), page 9, the COEC "incorporates investors' expected discounted future cash flows and the anticipated rate of return for participating in the firm." (A. Salvi, Vitolla, Raimo, Rubino, & Petruzzella, 2020)

The COEC estimation is a contentious issue in the field of finance research, mainly due to the fact that it cannot be directly observed, and its calculation is predicated on the outcomes of other estimations (Botosan, 2006). As a consequence of this, there is not widespread agreement among researchers regarding the method that is the most accurate for estimating this parameter (Botosan and Plumlee, 2005; Chen et al., 2023; Martinez-Ferrero and Garca-Sánchez, 2017; Rossi, 2016). From this vantage point, the majority of the academic literature has relied on two methodologies to estimate the COEC: the average realized returns model, and the residual income valuation model (Reverte, 2012; A. Salvi, Vitolla, Raimo, Rubino, & Petruzzella, 2020).

Researchers are in agreement that average realized returns are a poor proxy for anticipated returns and that using them results in a biased assessment of the COEC. This is because using average realized returns distorts the relationship between realized and projected returns. This is because the average realized return is determined by looking at previous returns rather than prospective returns when making the calculation.

Although Fama and French (1992) were unable to demonstrate a correlation between market beta and realized returns, Elton (1999) noted that average realized returns have been lower

than the risk-free rate for some period of time. This is despite the fact that Fama and French (1992) were unable to demonstrate a correlation between market beta and realized returns. Both Fama and French (1992) were unsuccessful in demonstrating a correlation between market beta and unrealized returns in their research.

On the other hand, the implied approach to estimating the ex-ante COEC is generally utilized by academics as well as practitioners, and it represents a more reliable choice to compute the COEC (Pástor et al., 2008; Reverte, 2012). According to this methodology, it is possible to arrive at an estimate of the ex-ante COEC that is impounded in the current market prices and the profit estimates of analysts. This is something that is plausible. Botosan and Plumlee (2005) refined and experimentally tested the reliability of five techniques for calculating the ex-ante COEC in order to achieve this objective. This was done in order to achieve this goal. Their research demonstrated that the target price approach (Botosan and Plumlee, 2002) and the price earnings growth method (Easton, 2004) are superior to the other options (Mazzotta and Veltri, 2014; A. Salvi, Vitolla, Raimo, Rubino, and Petruzzella, 2020).

According to Christine A. Botosan, Plumlee, and Wen (2011), the PEG metric is less susceptible to distortions in analyst forecasts than other implied COEC. The forecast horizon of the model is set at two years, and it is assumed that market participants do not anticipate any growth in abnormal earnings following the conclusion of this period. In addition to that, the model assumes there will be no dividends paid out in subsequent periods.

$$r_{PEG} = \sqrt{(eps_2 - eps_1) / P_0}$$

where r_{PEG} represents an expected COEC, eps_t represents earnings per share, and P_0 represents the price per share at the moment $t=0$.

We are taking into consideration the modified PEG measure (MPEG), which was proposed by Easton (2004) as a different proxy, so that we can improve the robustness and validity of our technique. To get an approximation of the cost of equity capital, we follow a number of

previous research that place a higher priority on the MPEG than the PEG measure (El Ghouli et al. 2011; Hou et al. 2012; Clarkson et al. 2013). Notably, Clarkson and colleagues (2013) find no evidence of a connection between environmental disclosure and the cost of financing when they apply this metric. On the other hand, in contrast to this study, their sample consisted entirely of enterprises operating in CSR-sensitive sectors.

The zero-dividend assumption is treated more leniently in the MPEG measure as compared to the r_{PEG} , and the estimate is expanded to incorporate anticipated future dividends. According to Botosan et al. (2011), MPEG correlates with realized returns as well as firm-specific risk proxies. Based on their findings, it seems that the most reliable substitute for calculating the COEC when neither the target price nor the PEG estimations are available is the MPEG (Clarkson et al. 2013).

$$r_{MPEG} = A + \sqrt{A^2 + (eps_2 - eps_1) / P_0}, \quad A = dps_1 / (2P_0)$$

where dps_1 = dividends per share. (Michaels & Grüning, 2017).

In order to increase the reliability and relevancy of the data, we excluded extraordinary items from the calculation of EPS.

5.2.2 Independent variables

The ESG disclosure score (ESG) is the study's independent variable. The chosen independent variable assesses a company's level of transparency in reporting ESG data. The ESG disclosure score is computed using information disclosed by firms in annual and sustainability reports, direct communication, press releases, third-party research, and news articles. ESG values range from 0.1 to 100, depending on the level of disclosure used. A score of 0 is provided to firms that do not disclose ESG information, while a score of 100 is assigned to firms that provide complete ESG information.

5.2.3 Control variables

In this section, we will describe the four control variables that were utilized throughout this research. These control variables are firm size, market-to-book ratio, Industry, and leverage.

I. Firm size (FS):

A proxy for the dimensions of the company is the natural logarithm of the total assets of the company; this logarithm can be determined. According to earlier research (Botosan and Plumlee, 2005), it is anticipated that the cost of equity capital will be negatively affected by the firm's size. This is the case due to the fact that larger companies are seen as having a lower level of risk due to the greater amount of information that is readily available (Cavaliere and Costa, 1999).

II. Market-to-book ratio (MTBR):

reflects the ratio between the market value and book value of equity as of the conclusion of the fiscal year. We anticipate that there will be an inverse connection between this variable and the cost of equity capital due to the fact that investors have a tendency to identify larger market-to-book ratios with companies that confront better profitability and enhanced prospects for growth (Mazzotta and Veltri, 2014; Raimo, de Nuccio, Giakoumelou, Petruzzella, & Vitolla, 2020).

III. Industry:

In the context of this thesis, the control variable known as "industry" plays a key role in assessing the study objectives and boosting the precision and validity of the findings. Additionally, this variable plays a significant role in determining whether or not the findings are reliable. In addition to that, the value of this variable is a major factor in establishing whether or not the findings may be relied upon. This binary variable is given the value 1 to represent industry units and the value 0 to represent non-industry units. Industry units are denoted by the value 1, while non-industry units are denoted by the value 0. We hope that by including the variable "industry" as a control in the analysis, we will be able to account for the potential influence that the industrial sector may have on the findings of the research while simultaneously isolating the effects of other independent variables. This would allow us

to account for the potential impact that the industrial sector may have on the findings of the research.

When doing research in which many types of companies each produce a distinct number of emissions related to ESG, it is very vital to take into consideration the industry control variable. It provides us with the opportunity to explore the different effects that are created by industrial and non-industrial units, so shining a light on the specific contributions that the industrial sector offers to the findings of research.

IV. Leverage:

Leverage refers to the amount of debt that a firm incurs in order to increase the potential return on an investment. Multiple studies have been undertaken, and each has reached a different conclusion regarding how leverage affects a company's performance. On the one hand, Jensen and Meckling (1976) hypothesize that leverage is a crucial element in the process of minimizing agency problems, namely free cash concerns. In addition, Stiglitz (1985) concludes that lenders rather than shareholders are more likely to exercise effective control over the activities of the manager. One could therefore conclude that there is a positive association between leverage and a company's success (Modigliani and Miller, 1963).

Andrade and Kaplan (1998), on the other hand, argue that the likelihood of a corporation experiencing a financial crisis decreases as its leverage decreases. The authors suggest that businesses with greater financial leverage tend to perform less well than those with less financial leverage. In addition, Myers (1977) indicates that large amounts of leverage may have negative effects on a company's performance due to the issue of underinvestment. Increased leverage impedes the company's ability to raise additional debt, which ultimately results in the loss of investment prospects and increase in COEC. By considering both sides, it is anticipated that LEV has a negative effects on COEC in our models.

When individuals refer to leverage, they are referring to the ratio of a company's total debt at a particular year (t) to its shareholders' equity at the same year (t). This proportion can be stated as:

$$\text{Leverage} = \frac{\text{Total debt}_t}{\text{Shareholder's equity}_t}$$

5.3 Empirical models

Furthermore, we utilized the second model to compare the results of our tests of the correlation between ESG and COEC in industrial vs. non-industrial businesses.

Model (1)

$$COEC_t = \beta_0 + \beta_1(ESG_{it}) + \beta_2(IND_i) + \beta_3(LEV_{i,t}) + \beta_4(LN(TA_{i,t})) + \beta_5(MTB_{i,t}) + \epsilon_{i,t}$$

Furthermore, we utilized the second model to compare the results of our tests of the relationship between ESG and COEC in industrial organizations to those in non-industrial firms.

Model (2)

$$COEC_t = \beta_0 + \beta_1(ESG_{it}) + \beta_2(IND_i) + \beta_3(ESG_{it} * IND_i) + \beta_4(LEV_{i,t}) + \beta_5(LN(TA_{i,t})) + \beta_6(MTB_{i,t}) + \epsilon_{i,t}$$

In addition, we employed the third model in order to determine whether or not there is a connection between the length of time since ESG disclosures and their impact on the connection between ESG and COEC.

Model (3)

$$COEC_t = \beta_0 + \beta_1(ESG_{it}) + \beta_2(IND_i) + \beta_3(LEV_{i,t}) + \beta_4(LN(TA_{i,t})) + \beta_5(MTB_{i,t}) + \beta_6(Y_{2006-2008}) + \beta_7(Y_{2006-2008} * ESG_{i,t}) + \beta_8(Y_{2009-2011}) + \beta_9(Y_{2009-2011} * ESG_{i,t}) + \beta_{10}(Y_{2012-2014}) + \beta_{11}(Y_{2012-2014} * ESG_{i,t}) + \beta_{12}(Y_{2015-2017}) + \beta_{13}(Y_{2015-2017} * ESG_{i,t}) + \beta_{14}(Y_{2018-2020}) + \beta_{15}(Y_{2018-2020} * ESG_{i,t}) + \epsilon_{i,t}$$

Where,

| | |
|------------|---|
| $COEC_t$ | Cost of equity capital at year t. |
| β_0 | The intercept. |
| β_i | Regression coefficient of each independent variable. |
| ESG_{it} | ESG score firm at year t. |
| IND: | Dummy for industry firms, whether the firms categorize as industry or not. The value is 1 if it is the entity representing the industry, and 0 otherwise. |

| | |
|------------------|--|
| $LEV_{i,t}$: | Leverge at year t. |
| $TA_{i,t}$: | Total Asset at year t. |
| $MTB_{i,t}$: | Market-to- Book -ratio at year t. |
| $Y_{2006-2008}$ | Dummy for period of reporting. As a result, the value1 if the ESG is reported in the period 2006 to 2008 |
| $Y_{2009-2011}$ | Dummy for period of reporting. As a result, the value1 if the ESG is reported in the period 2009 to 2011 |
| $Y_{2012-2014}$ | Dummy for period of reporting. As a result, the value1 if the ESG is reported in the period 2012 to 2014 |
| $Y_{2015-2017}$ | Dummy for period of reporting. As a result, the value1 if the ESG is reported in the period 2015 to 2017 |
| $Y_{2018-2020}$ | Dummy for period of reporting. As a result, the value1 if the ESG is reported in the period 2018 to 2020 |
| $\epsilon_{i,t}$ | The error term |

6 Empirical results on the effect of ESG on the COEC

In this dissertation, the empirical findings chapter's goal is to provide a thorough examination of the information that informed the previous chapters. This section assesses the effect of ESG issues on the COEC through descriptive data, correlation analysis, and regression models. Utilizing the features of the data analytics add-on for Microsoft Excel, the data analysis was conducted.

I. Statistical Descriptions

Understanding the Characteristics of the Investigated Variables is Made Much Easier Using Descriptive Statistics. In this section, we show essential measurements such as means, standard deviations, minimum and maximum values, and the distributional characteristics of the variables included in our research. For instance, the mean represents the average value of the variables, whereas the standard deviation represents the departure from the mean. The objective of descriptive statistics is to lay the groundwork for further statistical analysis by revealing the central tendency, dispersion, and shape of the data.

II. Analysis of Correlation

Through the use of correlation analysis, we are able to study the relationships between various variables and assess the strength and type of their connections. By computing the correlation coefficients, we can determine whether or not there are substantial linear relationships between the ESG indicators and the cost of equity capital. This analysis provides a foundation for further investigation by facilitating the discovery of likely links and dependencies between the variables.

III. Regression Evaluation

To investigate further the association between ESG qualities and the cost of equity capital, a regression analysis is conducted. This is achieved by employing this statistical method. We can quantify the impact that ESG metrics have on the cost of equity capital by creating

regression models and simultaneously correcting for a variety of other significant variables. The regression analysis gives actual evidence to support or refute the expected effects, thereby aiding in quantifying the magnitude and significance of the link.

IV. Microsoft Excel for Analytical Objectives

To do the data analysis, we utilized Microsoft Excel's rich data analytics features. Excel has a pleasant interface in addition to a vast array of statistical capabilities, which facilitates the computation of descriptive statistics, correlation coefficients, and regression models. Excel contains a multitude of statistical algorithms. Utilizing Excel's numerous features, we were able to undertake an accurate and trustworthy analysis of the information in a timely manner.

6.1 Descriptive statistics

As shown in Table 1, the descriptive statistics for the four independent variables, ESG, leverage, and Ln (TA), as well as the dependent variable COEC, are provided. Let's examine the data and condense it into language that is more simple and understandable.

Table 1 Descriptive statistic for variables

| | <i>COEC</i> | <i>ESG</i> | <i>Lev</i> | <i>LN TA</i> | <i>MTB</i> |
|---------------------------|-------------|------------|------------|--------------|------------|
| Count | 405 | 405 | 405 | 405 | 405 |
| Mean | 27,45 | 52,80 | 0,22 | 21,86 | 3,00 |
| Standard Error | 1,23 | 1,00 | 0,01 | 0,09 | 0,17 |
| Median | 21,30 | 56,28 | 0,22 | 21,74 | 2,21 |
| Standard Deviation | 24,68 | 20,13 | 0,12 | 1,81 | 3,47 |
| Sample Variance | 608,86 | 405,25 | 0,01 | 3,29 | 12,07 |
| Minimum | 0,05 | 6,27 | 0,00 | 15,60 | 0,11 |
| Maximum | 132,92 | 92,02 | 0,72 | 27,28 | 54,87 |

The average COEC in our sample, was 27.45, and the COEC values are extremely variable, with a large range that can go as low as 0.05 and as high as 132.92, indicating that the costs of equity capital for different companies can vary greatly.

Because the average number of ESG components in our sample is 52.80, it can be deduced that the companies that were taken into consideration had a medium level of dedication to ESG policies. The ESG scores range from 6.27 to 92.02, indicating a wide range of measures taken

by organizations to prioritize and integrate sustainable and responsible business practices.

The majority of the businesses in our sample had a leverage ratio of 0.22, which indicates that they have a suitable amount of debt in comparison to their equity. The majority of the businesses in our sample had a leverage ratio of 0.22, which indicates that they have a suitable amount of debt in comparison to their equity.

The natural logarithm of total assets has a mean value of 21.86, and this value represents the average size of the businesses that were included in our sample. The LN TA values have a standard deviation of just 1.81, which is a pretty low figure. This suggests that the size of the companies that were taken into consideration does not exhibit significant variability.

The market-to-book ratio of a firm is an indicator of the relationship between a company's market value and its book value. The average market-to-book ratio is 3.00, and MTB values have a standard deviation of 3.47, which indicates a significant dispersion and different perspectives held by the market regarding the value of the company.

For IND dummy variables, the numbers and percentage of observations can be seen in the below table, which shows that 132 of 405 firms are categorized as industrial entities.

Table 2 Number and percentage of IND(Dummy variable)

| | Number | Percentages |
|------------|--------|-------------|
| IND | 132 | 32,6 % |

Furthermore, for the Y-AB dummy variable, the number of observations and its percentage can be seen in the below table:

Table 3 Number and percentage of YA- B(Dummy variable)

| | Number | Percentages |
|----------------------|--------|-------------|
| (y2006-Y2008) | 51 | 12,6 % |
| (Y2009-Y2011) | 58 | 14,3 % |
| (Y2012-Y2014) | 60 | 14,8 % |
| (Y2015-Y2017) | 64 | 15,8 % |
| (Y2018-Y2020) | 137 | 33,8 % |

As it is clear, during this time, the number of ESG disclosures increased.

6.2 Correlation analysis of research variables

Table 4 below displays the correlation data used to evaluate the strength of the relationship between the research variables. The dependent variables, independent variables, and controls are all compared in this table.

Table 4 Correlation analysis between independent and dependent variables

| | <i>COEC</i> | <i>ESG</i> | <i>IND</i> | <i>Lev</i> | <i>LN TA</i> | <i>MTB</i> | <i>(y2006-2008)</i> | <i>(Y2009-2011)</i> | <i>(Y2012-2014)</i> | <i>(Y2015-2017)</i> |
|---------------------|-------------|------------|------------|------------|--------------|------------|---------------------|---------------------|---------------------|---------------------|
| ESG | -0,104 | | | | | | | | | |
| IND | 0,137 | -0,054 | | | | | | | | |
| Lev | -0,207 | 0,100 | -0,299 | | | | | | | |
| LN TA | 0,045 | 0,429 | -0,229 | 0,053 | | | | | | |
| MTB | 0,423 | -0,176 | 0,159 | -0,218 | -0,275 | | | | | |
| (y2006-2008) | -0,040 | -0,228 | -0,010 | -0,118 | 0,069 | -0,032 | | | | |
| (Y2009-2011) | -0,059 | -0,063 | 0,016 | -0,052 | 0,070 | -0,062 | -0,155 | | | |
| (Y2012-2014) | 0,004 | 0,054 | -0,008 | 0,041 | 0,103 | -0,022 | -0,158 | -0,170 | | |
| (Y2015-2017) | 0,154 | 0,188 | 0,016 | -0,063 | 0,110 | 0,027 | -0,164 | -0,177 | -0,181 | |
| (Y2018-2012) | 0,018 | 0,138 | -0,030 | 0,159 | -0,280 | 0,087 | -0,271 | -0,292 | -0,298 | -0,310 |

As can be seen from the table, there is a negative correlation between COEC and ESG (-0.104), which indicates that as the ESG scores go up, the COEC scores go down. This can be deduced from the fact that COEC is negatively connected with ESG. In addition, it is evident that COEC and IND have a positive association (0,137).

Furthermore, COEC has a somewhat negative correlation with leverage (Lev) (-0.207), which in turn demonstrates that there is a negative link between leverage and COEC. This table also displays the positive association between COEC and MTB (0.423).

6.3 Regression analysis

In this chapter, we put the theory from the previous section to the test. Table 5 shows the results of our models' regression analyses looking at the correlation between ESG ratings and the COEC of Finnish publicly traded firms.

I. First model

This coefficient, as shown in the table 5, represents the effect of the ESG variable on the dependent variable (COEC). The COEC is anticipated to drop by 0.143 units for each one-unit increase in ESG, assuming all other factors remain same. Since the P-value for this relationship is 0.017, the finding is significant at the 5% level and supports our initial hypothesis that "Disclosure of the ESG factor has a negative effect on the COEC."

The IND variable is a control variable that represents an industry-related factor within the context of this model. Based on the coefficient value of 4.811, it appears to have a positive effect on COEC. This effect has a p-value of 0.053, indicating that it is not statistically significant at the 5 percent level, but becomes statistically significant at the 10 percent level.

It may be deduced from the fact that the coefficient for Lev, which is another control variable, is -17.459 that this variable has a detrimental impact on COEC. Nevertheless, the p-value for this impact is 0.068, which implies that the significance threshold is only little more than 10 percent.

Table 5 Regression results

| | <i>Model1</i> | <i>Model2</i> | <i>Model3</i> |
|---|----------------------|----------------------|-----------------------|
| <i>variables</i> | <i>COEC</i> | <i>COEC</i> | <i>COEC</i> |
| Intercept | -43,522** (0,004) | -42,255** (0,005) | -59,700*** (0,001) |
| ESG | -0,143** (0,017) | -0,224*** (0,001) | -0,262 (0,134) |
| IND | 4,811* (0,053) | -8,734 (0,183) | 5,373** (0,026) |
| ESG*IND | | 0,264** (0,026) | |
| Lev | -17,459* (0,068) | -16,814* (0,078) | -16,907* (0,076) |
| LN TA | 3,272*** (0,000) | 3,402*** (0,000) | 3,752*** (0,000) |
| MTB | 3,095*** (0,000) | 3,110*** (0,000) | 2,904*** (0,000) |
| (y2006-Y2008) | - | - | 5,297 (0,603) |
| (Y2009-2011) | - | - | 13,433 (0,231) |
| (Y2012-2014) | - | - | 28,414** (0,022) |
| (Y2015*2017) | - | - | 49,208*** (0,000) |
| (Y2018-2020) | - | - | 4,550 (0,638) |
| ESG*(y2006-2008) | - | - | 0,004 (0,987) |
| ESG*(Y2009-2011) | - | - | -0,113 (0,625) |
| ESG*(Y2012-2014) | - | - | -0,293 (0,225) |
| ESG*(Y2015-2017) | - | - | -0,467* (0,060) |
| ESG*(Y2018-2020) | - | - | 0,199 (0,305) |
| Multiple R | 0,487 | 0,497 | 0,564 |
| R Square | 0,238 | 0,247 | 0,318 |
| Adjusted R Square | 0,228 | 0,236 | 0,292 |
| Standard Error | 21,679 | 21,572 | 20,763 |
| Observations | 405 | 405 | 405 |
| P-value in parentheses; ; * significant at 10%; ** significant at 5%; *** significant at 1%, 1-sided. | | | |

Analyzing data employs the control variable LN TA, which stands for the natural logarithm of total assets. Given the coefficient of 3.272, it can be concluded that the COEC will increase by 3.272 units for every one-unit increase in LN TA, assuming that all other variables remain constant. The fact that this effect has a p-value of 0.000 indicates that it is statistically significant.

The last but not least control variable is MTB, which represents a financial ratio of market to book ratio. The correlation coefficient of 3.095 indicates that MTB and COEC have a positive relationship. The 0.000 p-value signifies that this effect is statistically significant.

The multiple R-squared (0.238) and adjusted R-squared (0.228) values can be employed to analyze the model's overall performance. According to these results, approximately 23.8% of the variance in the dependent variable (COEC) can be explained by the independent factors included in the model.

II. Second model

What we can see Although ESG and COEC coefficients are -0.224, with a significant p-value of 0.001, these results indicate that there is a negative relationship between ESG and COEC for non-industrial units. This is what we find when we look at the table of results that is generated after taking into account the effect of industry units. In contrast, the coefficients for industries are the result of $(ESG + ESG \cdot IND)$, which is 0.039. Because this value is positive, it demonstrates that our second hypothesis will be rejected, and it also demonstrates that the association between ESG and COEC for non-industrial units is weaker than it is for non-industrial firms.

As expected for IND, the regression results for other control variables show the same result as what we discuss in the first model (positive relation for MTB and LN TA and negative coefficient for LEV).

III. Third model

As a result of the fact that the third model seeks to determine the effects of time on COEC and ESG debt, it is necessary to take into consideration the outcome of $ESG + (ESG + Y_{A-B})$. The

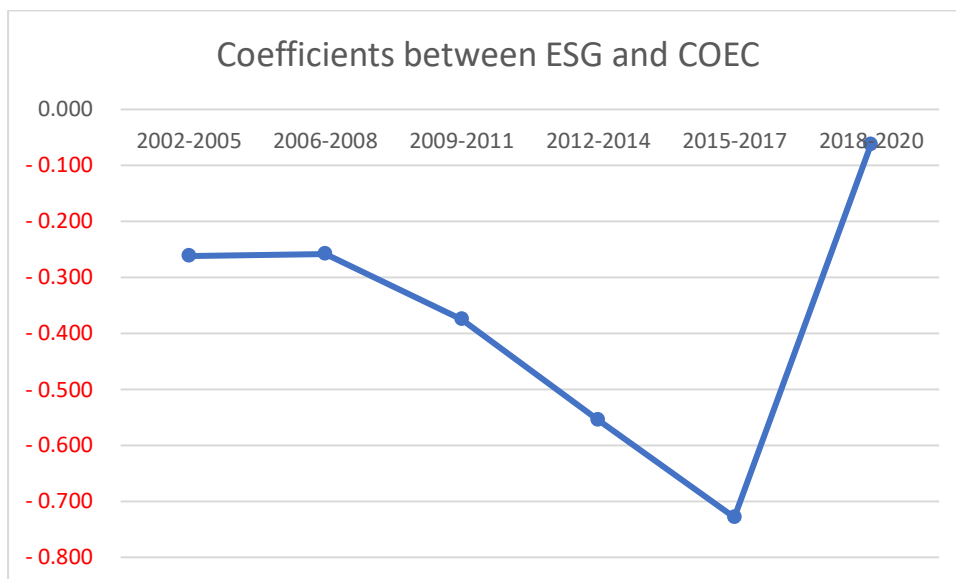
following table, number 6, was devised with the goal of reducing the overestimation of the results of the regression test:

Table 6 Coefficients result for Y_{A-B}

| Variable | Coefficients |
|-----------------------|--------------|
| ESG | -0,262 |
| ESG+ ESG*(y2006-2008) | -0,258 |
| ESG+ ESG*(Y2009-2011) | -0,374 |
| ESG+ ESG*(Y2012-2014) | -0,554 |
| ESG+ESG*(Y2015-2017) | -0,729 |
| ESG+ESG*(Y2018-2020) | -0,063 |

After a period of increasing from 2006 to 2008, the results suggest that the link between ESG and COEC became stronger from 2009 to 2017; this followed a period of increasing from 2006 to 2008. However, after 2018, the trend reversed, and the association was significantly reduced. The following graph presents the data in enquiry:

Figure 5 Coefficients trend between ESG and COEC during the years



Despite the fact that the P-value indicates that the results are not significant for specific time periods, we must evaluate additional criteria to determine the significance or relevance of the data. Even if the p-value of a coefficient is not statistically significant, it does not necessarily imply that the variable is unimportant or irrelevant.

In light of the growing concern about environmental issues in Finland, the demand for non-financial information, and the increasing position of ESG, we can conclude that ESG has had a more negative impact on COEC over the years. However, after 2018 and due to the impact of the COVID-19 pandemic, the results show different trends, and it can be said that after 2018 there were other significant issues that affected the relationship between COEC and ESG.

In this model, the regression findings for additional control variables exhibit the same outcome as in the first model (a positive relationship between MTB and LNTA and a negative coefficient for LEV).

6.4 Summery for results

In the table below, we can view a summary of the outcomes and compare them to our original hypothesis and expectations:

Table 7 The summary of results

| Variables | Predicted effect | Actual effect |
|---|-------------------------|----------------------|
| H1: Disclosure of the ESG factors has a negative impact on the cost of equity capital (COEC). | | |
| ESG | Negative | Negative |
| IND | Negative | Positive |
| Lev | Negative | Negative |
| LN TA | Negative | Positive |
| MTB | Positive | Positive |
| H2: The association between the ESG disclosure and the cost of equity capital (COEC) stronger in industrial firms than in other firms. | | |
| ESG+ ESG*IND | Negative | Positive |
| Lev | Negative | Negative |
| LN TA | Negative | Positive |
| MTB | Positive | Positive |
| H3: The association between the ESG disclosure and the cost of equity capital (COEC) has become stronger over time. | | |
| ESG+ ESG*(y2006-2008) | Negative | Negative |
| ESG+ ESG*(Y2009-2011) | Negative | Negative |
| ESG+ ESG*(Y2012-2014) | Negative | Negative |
| ESG+ESG*(Y2015-2017) | Negative | Negative |
| ESG+ESG*(Y2018-2020) | Negative | Positive |
| Lev | Negative | Negative |
| LN TA | Negative | Positive |
| MTB | Positive | Positive |

7 Conclusions

7.1 Discuss of finding

This paper aimed to examine the association between ESG disclosures and the COEC of Finnish listed firms from 2003 to 2022. In addition, we are searching for differences in the influence of ESG on COEC between industrial and non-industrial units. Finally, we attempted to test the hypothesis that the effect of ESG on COEC strengthens over time.

Our first hypothesis was supported by the regression results, which indicate a negative link between ESG disclosures and COEC. However, we were unable to identify a larger relationship between ESG and COEC for industrial enterprises relative to non-industrial firms. Although there are no statistically significant results for assessing the greater relationship between ESG and COEC through time, the coefficient between ESG and COEC increased from 2003 to 2017 before experiencing a decline for the years between 2018-2020.

The two basic mechanisms by which disclosure can reduce the COEC potentially explain our empirical findings. These strategies reduce information asymmetry and attract more long-term investment. Disclosure may lower the COEC. Generally speaking, environmental, social, and governance (ESG) disclosure entails exposing information regarding issues such as waste, pollution, emissions, human rights, gender policies, board composition, labor standards, corporate governance methods, and control mechanisms.

These particulars are playing an increasingly important role in investors' investing decisions. This view holds that full ESG disclosure has the potential to attract more long-term investors at the expense of those who are just interested in the short term. By definition, these investors are primarily concerned with the creation of long-term value, and they place a premium on information that indicates the future performance of organizations. In addition, they are especially interested in data that provides insight into the future success of firms. The perception of a reduced overall degree of risk will prompt the anticipation of a lower rate of return on investments. These conditions illustrate the rationale behind ESG disclosure, which, according to this theory, reduces the cost of stock while simultaneously increasing the number of long-term investors. (Raimo, Petruzzella, Salvi, & Vitolla, 2024).

Previous research identified a negative effect of voluntary disclosure (Botosan, 1997; Botosan and Plumlee, 2002; Hail, 2002; Francis et al., 2005; Espinosa and Trombetta, 2007), financial disclosure (Richardson and Welker, 2001), CSR disclosure (Dhaliwal et al., 2011, 2014), environmental disclosure (Plumlee et al., 2015), carbon disclosure (Albarrak et al. 2019), of intellectual capital disclosure (Orens et al., 2009; Mangena et al., 2010; Boujelbene and Affes, 2013) and of integrated reporting (Garcia- Sanchez and Noguera-Gamez, 2017; Zhou et al., 2017; Vitolla et al., 2020a) and ESG disclosures (Raimo, Petruzzella, Salvi, & Vitolla, 2024; (Raimo, Vitolla, Marrone, & Rubino, 2020) on the cost of equity capital. (Raimo, Vitolla, Marrone, & Rubino, 2020)

Although there is no preliminary research comparing the influence of ESG on COEC across industrial and non-industrial units, it appears that non-industrial investors pay more attention to COEC than industrial investors, who have a greater stake in environmental issues. This result contradicts what we hypothesized at the beginning of our study.

Regarding the third hypothesis, although increasing public knowledge of environmental and societal issues has been demonstrated in recent years, we have observed a negative association between ESG and COEC that has strengthened over the last decade (2018-2020). The impact of the Covid-19 epidemic can be seen in this recent downward trend.

7.2 Limitations on this research:

This study has been affected by some limitations; first and foremost, the ESG scores were only retrieved from a single database. As was said previously, there is no one system or set of principles that are universally accepted for determining those scores. ESG scores are determined by third-party, independent firms; hence, the methodologies of measurement utilized by each organization are distinct from one another.

In addition, the time frame of the research needs to be taken into account. Given the huge market shifts that occurred between 2019 and 2022, COVID-19 may have been a factor in influencing the ESG and financial statistics over that period. The pandemic has a substantial impact on risk measures as well as on the financial elements of many businesses, and it has its consequences for stakeholders.

Moreover, the time period under study encompasses a number of unexpected market events, most notably the market crash that occurred in early 2020 and the subsequent rapid bull market that followed.

7.3 Direction for future researches

ESG should be examined more because it is still a new concept in the financial business. To be able to draw broad conclusions about the ESG and its effect additional research is required to acquire a more comprehensive understanding of the issue.

Furthermore, the unpredictability and variations experienced during the COVID-19 pandemic, as well as the need to enhance firm component cleaning, must be factored into future outcomes. In addition, future research might look at how firms with high ESG- ratings are affected by stock market shocks in connection with the pandemic impact. The kind of panic that the outbreak caused.

Also, future research should look into the influence of non-listed enterprises as well as medium- and small-sized businesses.

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