Anni Eskola

Long-Term Sustainability Investments vs. Dividend Payouts

In analysis of firm values in Europe

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Author: Anni Eskola
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ABSTRACT:
As climate change accelerates, public debate on sustainable development, the United Nations' 17 Sustainable Development Goals, and commitment to them have spread globally. Despite this, there is no comprehensive commitment to the green transition due to, e.g., different opinions on climate change. Simultaneously, companies pay to get an ESG rating, which should define their commitment to sustainability and allegedly improve company value. Despite allegations about the prospects of ESG, the results are yet to be proven, as the trend is relatively novel, and the green actions allegedly take more time to be visible in practice. As time goes by, examination of green innovation is progressing, and the effectiveness of the green transition is being questioned, resulting in a decline in the ESG trend in designated areas. These observations raise concerns as to whether ESG-based valuation is superficial and solely based on market participants' belief in the validity of ESG ratings.

By critically examining ESG ratings and the impact of capital allocation decisions on traditional firm valuation models, the purpose of this thesis is to suggest an alternative measure to identify companies' and their market environments' engagement on sustainability and its impact on companies' capital allocation decisions, resulting in changes in company valuation. As sustainability engagement requires investments and the investments positively impact ESG ratings given by rating agencies, sustainability investments should impact the company's value if sustainability engagement matters in financial markets. In theory, the interaction between sustainable investments and engagement could result in an increase in firm value in areas with a high level of commitment to sustainability. In areas of low commitment, investing in sustainability could decrease firm value, and other capital allocation options, such as dividends, could be more beneficial in terms of company value growth, depending on stakeholders' preferences. However, in practice, changing capital allocation strategy is often based on the financial capabilities and long-term objectives rather than the stakeholders' wishes.

The results of this study reveal a positive connection between the market sentiment of sustainability to both environmental expenditures and dividends, and their further impact on firm value, but without the need for trade-off decisions. Despite the weakness of the connection, the results support the possibility of replacing ESG ratings with another measure, suggesting that the SDG Index rating could be useful in the development of a universal measure of sustainability engagement for companies.

KEYWORDS: ESG, sustainability engagement, investments, dividends, profit distribution, firm value

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TIIVISTELMÄ:
Ilmastonmuutoksen kiihtyessä myös julkinen keskustelu kestävästä kehityksestä, Yhdistyneiden Kansakuntien 17 kestävän kehityksen tavoitteesta ja niihin sitoutumisesta on levinnyt globaalilla tasolla. Tästä huolimatta kaikkialla ei sitouduta vihreään siirtymään, johtuen muun muassa mielipiteiden eroavaisuuksista ilmastonmuutosta kohtaan. Samanaikaisesti yritykset maksavat saadakseen ESG-luokituksen, jonka pitäisi määritellä heidän sitoutumisensa kestävään kehitykseen ja väitetysti parantaa yrityksen arvoa. ESG:n väitetyt mahdollisuudet ovat vielä todistamatta, sillä ilmiö on vielä suhteellisen uusi. Samanaikaisesti tutkimus kestävistä innovaatioista etenee, ja vihreän siirtymän tehokkuutta on alettu kyseenalaistamaan, joka on johtanut paikallisesti jopa ESG-ilmiön suosion hiipumiseen. Nämä huomiot herättävät huolta siitä, onko ESG-luokitukseen perustuva arvonnousu pinnallista, joka perustuu ainoastaan markkina osapuolten uskoon ESG-luokitusten pätevyydestä.

Tutkimalla kriittisesti ESG-luokituksia ja pääoman kohdentamisvaihtoehtojen vaikutusta perinteisiin yritysarvostusmalleihin, tämän tutkielman tarkoituksena on löytää ESG-luokitukselle vaihtoehtoinen tapa mitata yrityksien ja niiden toimintaympäristön sitoutumista kestävään kehitykseen ja sen vaikutusta edelleen pääoman kohdentamispäätöksiin, johtaen muutoksiin yrityksien arvossa. Koska kestävään kehitykseen sitoutuminen edellyttää investointeja, ja sijoitusten määrä vaikuttavat myönteisesti eri luokituslaitosten antamiin ESG-luokituksiin, tulisi kestävän kehityksen sijoitusten vaikuttaa yrityksen arvoon, mikäli kestävään kehitykseen sitoutumisella on merkitystä rahoitusmarkkinoilla. Teoriassa kestävään kehitykseen keskittyvien sijoitusten ja sitoutumisen vuorovaikutus voisi nostaa yritysten arvoa alueilla, joissa on korkea paikallinen sitoutuminen kestävään kehitykseen. Alhaisen sitoutumisen alueilla sijoittaminen kestävään kehitykseen voisi alentaa yritysten arvoa, ja muut pääoman kohdentamisvaihtoehdot, kuten osingot, voisivat olla hyödyllisempiä yrityksen arvon kasvun kannalta sidosryhmien mieltymysten mukaan. Käytännössä pääoman kohdentamisstrategian muutokset ja päätökset perustuvat kuitenkin enemmän yritysten taloudellisiin valmiuksiin ja pitkän aikavälin tavoitteisiin kuin sidosryhmien toiveisiin.

Tämän tutkielman tulokset osoittavat, että markkinoiden mielipiteellä kestävästä kehityksestä on positiivinen vaikutus yritysten kestävän kehityksen kuluihin ja osingonmaksun määrään. Vaikutus näkyy muutoksissa yrityksen arvossa ilman, että yritysten tulisi tehdä kompromissia kestävän kehityksen sijoitusten ja osingonmaksun välillä. Yhteyden heikkoudesta huolimatta tutkielman tulokset tukevat mahdollisuutta korvata ESG-luokitukset toisella mittarilla, ja tukevat sitä, että SDG indeksiluokitus voisi olla hyödyllinen tulevaisuudessa, kun kehitetään yrityksille yleiseen käyttöön soveltuvaa mittaria koskien sitoutumista kestävään kehitykseen.

AVAINSANAT: ESG, sustainability engagement, investments, dividends, profit distribution, firm value

Contents

Tables

Abbreviations

CDOs	Collateralized Debt Obligations
CF	Cash Flow
CPI	Consumer Price Index
CSR	Corporate Social Responsibility
DCF	Discounted Cash Flow
EEA	European Economic Area
EMH	Efficient Market Hypothesis
ESG	Environmental, Social, Governance
EU	European Union
GGM	Gordon Growth Model
HPR	Holding Period Return
LG	Location Greenness
MBS	Mortgage-Backed Securities
NAV	Net Asset Value
NGOs	Non-Governmental Organizations
OLS	Ordinary Least Square
PV	Present Value

REITs	Real Estate Investment Trusts
R&D	Research and Development
ROA	Return on Assets
SDGs	Sustainable Development Goals
SRI	Socially Responsible Investing
S&P	Standard & Poor’s
TVM	Time Value of Money
UN	United Nations
WACC	Weighted Average Cost of Capital

1 Introduction

Investment and profit distribution decisions are strongly connected to firm value through companies' financial strategy, capital structure, and risk management. Finding a balance between long-term sustainability investments and dividend payout is an essential part of companies' financial decisions to maximize firm value. Yet, due to changes and development steps of the financial markets and market conditions, decision-making is not simple. Sustainability has been an emerging subject due to climate change and global societal issues for the past few decades. Although the topic has been addressed and discussed for decades, its seriousness has only become concrete globally in the 21st century.

Over the last decade, companies have begun incorporating sustainable courses of action and environmental, social, and governance (ESG) factors into their operations, both on a legislative and voluntary basis. Global public debate on sustainable development puts pressure on companies to allocate capital and develop business operations in a greener direction. On the contrary, sustainability investments might restrict capital allocation to more profitable projects and the distribution of profits. These issues can arise from, for example, differences in stakeholders' preferences and social values in companies' business strategies (e.g., Pozen, 2015; Fredenreich et al., 2020; Tapaninaho & Heikkinen, 2022).

The existing literature has comprehensively examined the prospects of sustainability engagement for value creation, focusing on the ESG ratings of companies rather than the capital gain of sustainable investments. Based on the existing literature, using the ESG ratings in this study would have been well justified. However, ESG ratings are provided by rating agencies for payment, creating uncertainty about their trustworthiness. Due to the novelty of the ESG trend, the effectiveness and the pros and cons of sustainable investments and actions are yet to be determined and confirmed in the long run.

In the financial markets, firm value is often examined with fundamental, market- based methods such as the Gordon Growth Model (GGM) and accounting-based methods, such as return on assets (ROA) in addition to theoretical viewpoints, such as the shareholder theory suggested by Friedman (1970). Sustainable investments require higher initial investment and take a longer time to offer cash flows (CFs) (Silva et al., 2024), which in turn impacts the present values (PVs) through, e.g., discount rates, making it more complex to compare with traditional projects with earlier CFs and expectedly lower discount rates (Cornell, 2021).

ESG engagement and sustainability investments are presented as improving risk tolerance yet carrying an amount of uncertainty of profits (Zhang et al., 2024), which refers to the increased risk of investment. The differing characteristics and impact on firm valuation of sustainable investments, traditional investments, and dividend payout emphasize the importance of understanding the capital allocation decisions of companies and their impact on valuation.

The uncertainty related to sustainability in business raises concern about whether the alleged value creation prospects are based on market participants' beliefs or actual economic yield. According to the fundamentals of finance, all that matters are CFs, rates, and time. The strongly related PV formula is presented as follows.

$$PV = FV\frac{1}{(1+r)^n} \quad (1)$$

Where FV is the future value, r is the rate of return, and n is the number of periods, e.g., years. When evaluating company value in the long run, both dividends and profits from sustainable investment projects should be evaluated by the PV formula rather than qualitative opinions and arguments, referring to the irrelevancy of dividends or ESG ratings. When trends like ESG accelerate, the fundamentals of finance tend to be forgotten by market participants. Rather than valuing ESG ratings or the impact of sustainability engagement on firm value directly, the impact through CFs should be analyzed.

1.1 Purpose of the study

A considerable amount of research focuses on examining firm value impacted by the ESG ratings or sustainability disclosures of companies (e.g., Giese et al., 2019; Alareeni & Hamdan, 2020; Giese et al., 2021; Rahat & Nguyen, 2024). The commercial nature of the ratings, as well as their reliance on unstandardized reports and the company's public green image, makes it problematic to use them in research reliably. Only a few, if any, have measured ESG performance with sustainability investments, e.g., real sustainable operations providing evidence of sustainability engagement. Considering the undetermined official ESG rating scale, bias of ESG rating agencies, and their history, examining the impact of ESG ratings seems illogical when other options are present.

The concern is that ESG ratings used in research are from the same rating agencies that provided falsified or fraudulent credit ratings for mortgage-backed securities (MBS) and collateralized debt obligations (CDOs) issued by banks and mortgage lenders in the financial crisis of 2007. The same agencies, Moody's and Standard & Poor's (S&P), along with others, are some of the leading ESG rating providers in today's financial world. Their rating methodologies are differentiating, and the exact rating measures are not revealed to the public. Due to the inconsistency of ESG ratings and contradiction across companies, this study uses another measure for sustainability engagement and its impact on firm value. After all, CFs are what matters, and thus, examining capital allocation on sustainability and its' profits in terms of CFs should be prioritized.

If firms do engage with sustainability, it seems reasonable to assume that they would allocate capital to it. The disagreement on the rating methodologies is connected to individuals' perceptions of the risk companies are carrying and, thus, firm value (Wang et al., 2024). For example, Huang and Lin (2022) found a positive correlation between corporate social responsibility (CSR) and perceptions of climate risks, especially when local investors are present. Considering the capital required to participate in the green transition, such a relationship should be visible in companies' investments or capital allocation in sustainability.

Given the bias and lack of transparency of ESG ratings, the main aim of this thesis is to examine how capital allocation decisions impact on firm value in varying market sentiments regarding sustainability. I propose an alternative measure for sustainability performance and engagement impacting firm valuation. To combine true economic engagement (capital allocation) and output to the local societies, companies' environmental expenditures and countries' Sustainable Development Goal (SDG) Index rating are examined together to replace ESG ratings. The SDG Index rating is country-level measure to detect countries performance on 17 SDGs defined by the United Nations. Companies' performance on sustainability contributes to the SDG Index rating, and the rating can also be used as an indicator of countries market sentiment regarding sustainability. The environmental expenditures are reported by companies in their financial statements.

To compare alternative capital allocation option for environmental expenditures to create value, dividend payout is analyzed. Dividends are widely used in acknowledged and accepted fundamental company valuation models and literature (e.g., Williams, 1938; Gordon & Shapiro, 1956), and being a traditional form of CFs, their relevance and role have been discussed widely in the existing literature (e.g., Modigliani & Miller, 1961; Rees & Valentincic, 2013). Investors' interests and companies' benefits from dividend distribution have been found to change depending on, for example, the market environment, economic situation, and board characteristics.

Stakeholders' preferences, which are impacted by overall market sentiment, affect companies' market values. According to the shareholder theory (Friedman, 1970), companies should maximize their shareholders' wealth and operate according to their wishes. Simultaneously, the stakeholder theory (Freeman, 1984) suggests that companies should manage to produce well-being for stakeholders and the environment in which they operate. When the perception of climate change and engagement in SDGs is positive, companies' sustainability actions should be highly appreciated. In contrast, pessimistic opinion on climate change could decrease local investors' demands for sustainability engagement. Depending on the market environment, economically the most reasonable option

might not be best for the firm value if ecological matters are valued highly, conflicting with foundational economic principles due to investors' demand and governments' regulation. Thus, the primary hypothesis of this thesis is:

$Null_1$: In terms of firm value, there is no effect of market sentiment on sustainability on the trade-off between long-term sustainability investments and dividend payouts.
H_1: In terms of firm value, long-term sustainability investments are the preferred choice over dividend payout when the market sentiment is highly engaged in sustainability.

If H_1 holds, it should be possible to capture the relationship between a company's environmental expenditures and a country's SDG Index rating. Finding a positive relationship would support the effectiveness of using environmental expenditures and SDG Index rating together to capture the social impact for firms' capital allocation decisions on sustainability, which further contributes to value creation. In this regard, the secondary hypothesis of this study is as follows:

$Null_2$: There does not exist a relationship between a country's SDG Index rating and a company's environmental expenditures.
H_2: There exists a positive relationship between a country's SDG Index rating and a company's environmental expenditures.

1.2 Structure of the study

The first chapter introduces the topic and aims of this study. The second chapter introduces the main theories behind the concepts and subjects behind the research objective, explaining the behavioral and theoretical background. The theories aim to explain the connection between firm value, market participants, and dividends to shed light on how they explain and impact the research outcome. Chapters three and four explain the principles of sustainability, dividends, and company valuation. Additionally, the chapters discuss in more detail why and how sustainable investments and dividend payout affect

firm values, the criticism and praise the subject areas have faced, and compare the related capital allocation decisions and the outcomes.

The fifth chapter covers a literature review, including a discussion of the existing literature on the research topic and their findings, which support the relevance of the topic and contribute to the expected outcomes. The empirical part is covered in chapters six and seven. The sixth chapter describes, defines, and validates the data and variables selected for the study in addition to the methodology applied in the analysis. The regression results and hypothesis interpretation are implemented in chapter seven. Finally, chapter eight discusses the main findings, discusses the practical implications of the findings, and suggests ideas for future research.

2 Theoretical framework

The purpose of this chapter is to present the key theories concerning the topic of research. The theories specifically address the role of stakeholders in the development of company valuation with details, and the role of dividends in financial markets. Theories can be used to support the importance of the research topic by looking for cause-and-effect relationships that may also impact the research results. To examine company values in this study, the centrality of shareholder and stakeholder theories is emphasized, based on previous literature in which the connection of the value of companies to stakeholders' perceptions has been extensively studied (e.g., Jara-Bertin et al., 2008; Carvalhal, 2012; Teti et al., 2021).

The behavior of market participants is influenced by many environmental factors, which institutional theory explains in part. The market environment, economic situation, and trends around the world affect both administrations, market participants, and the connection between them. Dividends, on the other hand, have served as a valuation method for companies as well as a signal for companies' financial condition for decade. According to Graham (2022), CFOs consider dividend payout equally important to investments, which contradicts the irrelevancy theory of dividends and would align with the principles of finance regarding the importance of CFs.

2.1 Shareholder theory and stakeholder theory

In 1970, Milton Friedman published a doctrine in the New York Times about companies' main objectives. Friedman (1970) argued that the social responsibility of companies is to maximize the shareholders' wealth and regard that objective in decision-making. According to the theory, companies are not responsible for the environment and people around them but only respond to the shareholders' wealth. Thus, using resources such as capital on public welfare is considered a mistreatment of shareholders' money. However, if it is the shareholders' wish to participate in good causes, it should be executed.

Company management (agents) work for the best interest of shareholders, and in case of misbehavior, shareholders hold the power to change the management (Friedman, 1970). Considering that the core goal of investing is obtaining profit for the initial investment and building wealth, shareholder theory efficiently explains the role of companies in the investing context.

The stakeholder theory, presented originally by Freeman (1984), extends the idea of shareholder theory of companies' responsibility to all involved stakeholders. Shareholders are part of companies' stakeholders, which emphasizes the importance of considering both theories. According to Freeman (1984), stakeholders consist of all individuals and organizations who interplay with the company in question. Stakeholder theory creates higher social pressure on companies as there are more quarters and their well-being to be considered. In a market environment where the stakeholder theory is adopted widely, there exists a higher risk of reputational damage and a decrease in firm value for companies that overlook stakeholders (Freeman, 1984). Contrary to shareholder theory, which focuses on capital position, stakeholder theory emphasizes the overall value maximization of stakeholders, whether it is in form of CFs or something else, like well-being.

2.2 Institutional theory

Institutional economics examines the role of rationality in decision-making when institutions and social norms are shaping the decision-making process of market participants. Applied to the corporate context, institutional theory explains the foundation of, e.g., norms, values, and routines within institutions and organizations, creating the social behavior entity. The foundation of institutional theory was introduced by Thorstein Veblen in 1899. In his book, Veblen (1899) describes and criticizes individual behavior, changed conceptions of consumerism, and social classes. For example, he discusses the urge of lower-class nationals to pursue the consumer behavior of higher-class nationals to attain higher social acceptance at the cost of further deterioration of their economic situation.

The theory aims to support understanding the rationale behind the decision-making process of managers, which is based on social motives and pressures, such as government recommendations and exhortations. These recommendations can shape the preferences, presumptions, and expectations of market participants, further increasing the social pressure on company managers and, thus, impacting decision-making towards behavior more befitting of the market environment.

Deviant behavior regarding social norms can result in unfavorable attention and loss of firm value. Furthermore, according to the theory, ignorance of common social norms is more destructive to firm value compared to the financial profits forfeited if the social norms are adopted in the company. When the market consists of several businesses in the same industry, the social pressures can result in significant similarities in corporate characteristics (DiMaggio & Powell, 1983), which might interrupt the competition in the market and decrease firm values.

2.3 The (ir)relevancy of dividends

In 1956, Gordon and Shapiro published an article discussing the novel asset valuation and analysis tools. Specifically, they underlined the absence of a valuation method for the required profit rate of investment, considering its importance in qualifying an investment suggestion for capital allocation. Referring to the shareholder theory, Gordon and Shapiro (1956) introduced their own valuation formula, known as the Gordon Growth Model (GGM). The model is also known as the constant growth discounted cash flow (DCF) model, a specific type of general DCF model, which is discussed in more detail in chapter 3.4. According to the model, a company's intrinsic value can be defined by the PV of constantly growing, expected future dividend payments.

The GGM argues that dividends can be expected to grow at a constant rate since, in general, companies move a fraction of their income after taxes to retained earnings, and it is expected that companies earn a certain rate of return on the book value of their

common equity yearly. Thus, the current stock price of a company should reflect the expected dividends, considering the growth rate. Moreover, it is assumed that dividend payments are infinite. The GGM is presented as follows:

$$P_0 = \frac{D_1}{k-g} \quad (2)$$

Where P_0 is the stock price at t = 0, D_1 is the amount of dividend paid (CF) at the end of period 1, k is the required profit rate, and g is the expected constant growth rate of dividends (CFs). As the model includes an expected growth rate estimated by each individual and their information in addition to the expected dividend, it is possible to estimate whether the current stock price corresponds to the stock price given by the model. If the values are the same, the stock should reflect the correct market price given the future dividends. More importantly, the model makes it possible to define the rate of profit required by the market at which a stock should be priced. What must be noted is that the model assumes CFs do grow infinitely, which is not real. Yet still, possibly due to the wide acknowledgement of the model and humans' tendency to be overoptimistic at times, the growth rate (g) is often overestimated which leads to higher expectations towards companies' and possibly lower realized growth (Chan et al., 2003).

The model highlights the importance of dividends and their growth prospects from the viewpoint of stock valuation and capital allocation for investors. Widely used valuation methods, such as dividend yield and common yield, overlook the growth prospects, making them unable to be used for future profit estimation (Gordon & Shapiro, 1956). Given that investments are expected to yield profit in the future, either through value growth or dividends, using a model that fails to consider growth opportunities is insufficient (Gordon & Shapiro, 1956).

Controversially, the relevance of dividends has been widely questioned and criticized in the financial world. One of the most well-known theories critiquing dividends is the dividend irrelevance theory presented by Modigliani and Miller in 1961. In their article,

Modigliani and Miller focus on the effects of dividend payments on a company's market value and the choice between paying dividends and reinvesting assets. Shareholders' wealth decreases by the amount of the dividend payout, resulting in a break-even situation. In other words, dividend payments do not have a positive or significant impact on stock prices, and reinvestments made within a company could yield profits exceeding the profits made by investing the paid dividend themselves (Modigliani & Miller, 1961).

Reinvestments increase company value and, thus, shareholders' wealth through capital gain (Emanuele et al., 2021). Paying dividends can be an established habit for companies that have paid dividends for years. As dividend payout is a common way to reward shareholders for their investments, companies might be devoted to maintaining dividend payments. Furthermore, adjusting or ceasing payments can cause negative signals for the stakeholders and the overall market (Brealey et al., 2014, p. 404). On the contrary, according to Graham (2022), dividend payment is kept for long periods especially among mature firms. Changes in dividends are made only if the management views that continuing payment is not possible in the long run (Graham, 2022).

3 Sustainability engagement and long-termism

Companies' engagement in sustainability has acceleratingly gained investors' interest during the past two decades. The motivation arises from the increased concern about climate change and global interest in equality and social matters. CSR is known as one of the first frameworks to guide companies on how to operate more sustainably, being apparent in the financial literature since the 1950s (Low, 2016). However, CSR performance cannot be measured clearly, which makes it challenging to use it as an indicator to compare companies' sustainability performance and, thus, as a tool in the financial markets (Low, 2016).

In 2004, the United Nations Global Compact presented the concept of ESG, which is a guideline and framework for capital markets and companies to enhance operations and focus on investing sustainably to improve profits and the well-being of the environment and people, aiming to fulfill the SDGs. Nowadays, when discussing sustainability in the context of companies, performance is often measured with ESG standards. In both literature and public discussion, ESG is often used as a synonym for overall sustainability. Thus, in this thesis, ESG and sustainability are used as synonyms as well.

According to the United Nations Global Compact (2004), by following ESG guidelines, companies can create value for themselves and the society and community around them. ESG aligns with the objectives and principles advocated by CSR, as they both emphasize the incorporation of competencies related to sustainable, social, and environmental issues influencing companies' overall performance (United Nations Industrial Development Organization, n.d.). However, there exist both opportunities and risks in ESG. Opportunities consist of, for example, enhanced risk management and cost-effectiveness (United Nations Global Compact, 2004). Risks such as a lack of universal sustainability measures, and uncertain effectiveness of ESG actions raise concerns. Market participants put social pressure on companies regarding sustainability engagement, while the arguments on of behalf of sustainability are not fact-checked properly.

When going into the topic, it should be noted that the ESG trend has lost popularity in the United States when this thesis is written. The ESG trend rose strongly in the U.S. when Larry Fink, CEO of BlackRock, told his views on the connection between climate risks and investment risks. Fink's actions have been somewhat unethical, as by using BlackRock's major voting rights (Linn, 2021), Fink merged his own opinion to the companies BlackRock owns in addition to the overall financial markets.

Given the ethical characteristics of ESG, Fink's actions are somewhat conflicting and makes one question whether his actions were ever related to concern on climate change or rather purely to exercise control in any way (Puzder, 2023). After just a few years, Fink has changed his opinion regarding asset managers role of promoting ESG to companies, while simultaneously President Trump's actions separate the United States from global climate actions. The decline of the ESG trend in the United States is not visible in Europe, at least not as strongly. Thus, in this thesis ESG is discussed and observed mainly from Europe's standpoint, both in theory and data. The data is discussed more in chapter 6.

3.1 Definition of E, S, and G

The environmental, social, and governance pillars each represent themes within the subject area. Together, these three pillars aim to create more value for companies and their stakeholders and the environment (United Nations Global Compact, 2004). To fully engage with ESG, companies should determine the issues related to each pillar separately, considering the characteristics of their industry, operating environment, and competition. Although the approach and implementation of ESG can vary depending on the company and industry, the core themes of each pillar are coherent.

The first pillar, environment, represents climate change, natural resource usage, and biodiversity loss (United Nations Global Compact, 2004; United Nations Principles of Responsible Investment, 2018). The main goal is to ensure the sufficiency of Earth for both people living today and future generations (United Nations Global Compact, 2004).

Moreover, the goal is to find alternative ways to operate using renewable resources sufficiently, ideally even more cost-efficiently than before. Actions that could be done to reach the goals include investments in energy renovation, changing to renewable materials, and re-examining the efficiency of production and resource usage (United Nations Global Compact, 2004).

The second pillar, social, includes themes such as well-being, equality, and human rights (United Nations Principles of Responsible Investment, 2018). The aim is to enhance the interaction and communication between people and corporations, achieve equal premises for everyone, prevent conflicts, and defend freedom of speech (United Nations Global Compact, 2004; United Nations Principles of Responsible Investment, 2018). These goals can be pursued by, for example, ensuring the application of human rights in workplaces, cooperating with socially responsible companies, and engaging with local communities. Relationships and approachability are at the core of the social pillar of ESG.

The third and last pillar, governance, represents themes visible in company structures and management, such as accounting and audit framework, board structure, and compensation. Incorporating governance guidelines into business operations, the goal is to ensure that company practices follow legal, stakeholder-serving ways of doing work, improving transparency, and ensuring the prevention of conflicts of interest and unethical actions (United Nations Global Compact, 2004). Moreover, the governance pillar combines the goals and actions of the environmental and social pillars into the company strategy and management (United Nations Principles of Responsible Investment, 2018).

Compared to the first two pillars, the governance pillar has a relatively smaller role in the entity since it represents themes that can be considered a presumption of company values. Corporate governance was studied for years before ESG (Starks, 2023), and having related frameworks and rules is a legal requirement (e.g., European Commission, n.d. A). On the other hand, including governance in ESG emphasizes the need for

comprehensive responsible governance, indicating that the governance principles existing before ESG are not sufficient (Starks, 2023).

3.2 Opportunities

ESG and framework provide investment ideas and practical development targets for companies, which take into consideration the wide range of themes the SDGs contain. It is argued that if all companies, with their stakeholders, implemented ESG in their actions, together they could make real change for the issues (United Nations Global Compact, 2004). Accordingly, without comprehensive cooperation, the goals can be hard to reach, endangering business continuation in the long run.

ESG aims to create a more stable financial market globally, involve and support sustainable development, enhance understanding and communication between corporations and stakeholders, and increase transparency and trust of banks and other financial institutions (United Nations Global Compact, 2004). Sustainability disclosures enhance the transparency of business operations, which assists in building stronger trust between stakeholders and the company management. The disclosures often include a government section in which the governance practices and business ethics are described in more detail (SAP, 2024), preventing principal-agent problems from occurring.

ESG investing contributes to the approachability of investing through broader valuation practices, whereas traditional investing is often viewed as purely calculation-based and perfect information-seeking (Leins, 2020). New sustainable development themes may have sparked interest in investing among people who have not previously invested, for example, based on criticism of capitalism. Thus, ESG engagement can attract new investors, especially those using the ESG framework in their investment strategy, called socially responsible investing (SRI). Investors are implementing different sustainable investment strategies, not only due to pure interest but also for the profits the strategy has achieved during the last decade. For example, during the period 12/2021-02/2024, the

S&P 500 ESG index outperformed the S&P 500 index by 4 % on average (Statista, 2024 A). However, it must be stated that since the beginning of 2024, the ESG trend as slowly began turning down. For example, based on Morningstar data, Warner (2024) reported in total of $13 billion in withdraws from sustainable funds during 2023.

Further potential exists from the increased in investor attraction for companies that have not previously engaged with ESG (S&P Global, 2020; Flammer, 2021). Accordingly, by raising investor interest, companies' market value can increase, and more capital can be raised, improving companies' financial position. Companies can decrease the volatility of their stock in a crisis by preparing for future uncertainty, making their company more attractive to investors. The positive outcomes of risk management arising from ESG engagement appear as increased and less volatile CFs (Barth et al., 2021), which should, in theory, result in increased asset value and decreased probability of default (Merton, 1974).

Cost-effectiveness and risk mitigation are two of the most significant benefits of sustainability engagement. A strong ESG position can reduce the costs of raw materials, water, and carbon, which affect up to 60 % of companies' operating profits (Henisz et al., 2019). For example, lower carbon emissions can positively impact companies' taxation in some countries (World Bank, n.d.), and recycled materials can be more affordable and easier to acquire, resulting in a higher sales margin. According to some estimations, given the current level of consumption and the known natural reserves, petroleum and natural gas are estimated to last, at most, until the end of the 21st century (Kuo, 2019). Petroleum and natural gas' continuous demand and weakening supply increase costs and might delay production processes, creating additional costs for companies. Because resources will not last indefinitely, there is a risk to the continuity of business in certain sectors without sustainability related research, development, and commitment.

Related to the uncertainty of resources in the future, companies have come up with different ways to combine economic and ecological efficiency, considering the company's

financial needs as well as the needs of stakeholders. For example, the logistics sector has begun offering a “carbon footprint offset” with a surcharge when making a purchase. This implies that the engagement is unprofitable without extra charges due to the costs that come with the green transition. On the other hand, offering sustainable options for an additional charge in areas where sustainability is regarded as crucial, despite the charge, can increase firm value. This is because providing sustainable options for additional charges signals companies’ interest in the green transition while maintaining a stable financial state. This is a good example of finding the balance between economic and ecological sustainability, related to the aims of this thesis.

According to Finnair (n.d.), the carbon footprint can be reduced by using renewable fuel, which is currently three times more expensive than petroleum and natural gas. Additionally, it is stated that the more renewable fuel is utilized, the more cost-effective it becomes. Thus, without customers’ willingness to share in the costs, there is no guarantee that the company will fully adopt renewable fuel. Despite stakeholders’ enthusiasm for ESG engagement, the compensating services have not garnered much public interest (Zhang et al., 2024). For example, only one-hundredth of customers paid for Finnair’s optional carbon footprint compensation service in 2022 (Kungas, 2022).

Green bonds are another channel through which companies and governments can engage with sustainability. They simultaneously acquire capital to finance future sustainable investments, aiming to result in value growth. Green bonds have gained recognition, and market participants’ interest has accelerated. The value of issued green bonds increased from 37,1 billion USD to 587,6 billion USD from 2014 to 2023 (Statista, 2024 B). The profits gained from green bonds are allocated to reinvestments in the green transition, such as renewable energy acquisition (Nordea, 2023).

Issuing green bonds attracts investors using SRI strategies and can thus positively impact the stock price. However, earmarking income from green bonds to sustainable projects restricts companies’ investment opportunities (Flammer, 2021) and can result in

decreased investment profits. Green bonds create additional costs related to third-party verification of the bonds' validity. Yet still, they are argued to offer economic benefits through lowered cost of capital arising from the societal benefits the bonds provide (Cornell, 2021; Li et al., 2024; Alves & Meneses, 2024).

3.3 Risks

The uncertainty related to sustainability measurements and ESG action's effectiveness are one of the most significant issues. Discussion on global warming has increased peoples' interest in ESG, while risks regarding the misusage of ESG matters and tools rise. Literature has examined whether the profitability of ESG arises from the actual sustainable actions or rather the sale and commercialization of the term and its themes. Leins (2020) discusses the development of ESG and its inclusion in global investment markets and economies after the financial crisis. Accordingly, capitalism has been criticized throughout the centuries by certain individuals and groups for its separation from morality and unethicality. With ESG, investment advisors and fund managers obtained a tool to overturn these standpoints by including a comprehensive framework to capture profits more ethically, at least ostensibly (Leins, 2020).

ESG innovation and investments are novel, and thus, the outcomes of the projects and cost structures are difficult, if not impossible, to predict. Considering the uncertainty associated with sustainable investments and the opportunity cost of capital, it remains a complex issue about whether managers are motivated enough to allocate capital to sustainable projects and global well-being if there are other options available. The proceeds of ESG investments are not always analyzed properly. ESG has been stated as a tool for long-term value creation, and the research in the field uses ESG ratings and disclosures as a proxy (e.g., Duque-Grisales & Aguilera-Caracuel, 2021; Giese et al., 2021; Chiaramonte et al., 2022) despite their weaknesses.

In areas with positive opinion and demand for sustainable actions, companies might be forced to engage with ESG at the cost of superior profitability, especially if the reputational damage of not engaging with ESG would result in greater losses. This relates to the importance of market sentiment on sustainability, and the H_1 of this thesis. However, the changes in investor preferences can be harmful to firm value, as the changes can raise costs or require innovation and resources from companies. For example, Barth et al. (2022) found that ESG rating is positively correlated with default risk, indicating that ESG engagement, at least in terms of ESG rating, is not paying off.

Awareness, discussion, and the consequences of climate change slowly shift ESG matters into a social norm rather than a voluntary scale of company values and actions. This is reflected, among other things, in that governments and global organizations are increasingly demanding sustainable actions from companies (e.g., European Commission, n.d. B; U.S. Environmental Protection Agency EPA, n.d.). The influence of governments and NGOs on stakeholders refer to the institutional theory of behavior, which explains how social norms make individuals demand certain actions from organizations without questioning the correctness or facts of the norms. People trust governments and politicians' opinions without verifying the validity of their arguments due to their social status. Currently, such behavior is problematic since governments have noticed the economic inefficiencies of sustainable investments but are not shedding light on them for the public.

Due to a lack of resources, such as time or capital, engaging with long-term sustainable investments not always possible. In that case, companies might resort to greenwashing, which means making operational changes that give the impression of greener business practices. A prevalent method of greenwashing is voluntary ESG reporting, in which companies release a document discussing and presenting their sustainable values and goals. This awakens investor interest and positively impacts firm value, while companies should only be lauded for serious actions (Friske et al., 2022).

Voluntary reporting can be undertaken to deepen the scope of company sustainability engagement. Compared to legislatively mandatory sustainable reports, voluntary reporting is not under the scope of verification, and thus, there might not be any guarantees for the content's veracity. Alongside voluntary reporting, Flammer (2021) suggests that green bonds can be used as a greenwashing tool, as the bonds' true impact on nature is often meager, and rating agencies' and market participants' positive reactions arise only from promising projects made by companies. Both voluntary sustainable reporting and green bonds cause additional costs and restrict capital allocation to other, possibly more profitable projects.

Greenwashing is not beneficial in the long run, as by analyzing companies' figures more in detail, market participants and authorities can detect if the green transition is only ostensible. If greenwashing is noticed, there is a risk for, e.g., reputational damages (Ioannou et al., 2022) and loss of firm value. Obtaining ESG-originated profits by manipulating ESG documents in collaboration with rating agencies is also called rent-seeking (Zhang et al., 2024). Flammer (2021) discusses green investments through green bonds as "a credible signal of the commitment toward the environment", simultaneously noting that the impact of the bonds is small or irrelevant to nature. The signaling effect of ostensible green practices embellishes the truth behind sustainable investments and raises the risks associated with the investments.

Authorities influence how much ESG disclosure is required without analyzing the differences on the subject across industries properly, which makes sustainability incomparable across industries. For example, natural resources are at the center of the energy industry, making ESG regulations stricter for companies in the field (Flammer, 2021). The regulation forces the energy industry to invest and focus more on sustainable activities compared to, e.g., the banking sector. There exist significant sector differences, as not all industries cause emissions equivalently – banks might have higher performance on the environmental pillar compared to manufacturing companies, but it does not mean that they would use resources as much to lower their emissions. Their operations do not

simply impact the environment in the same way. These inconsistencies are not communicated to the public clearly enough, resulting in inefficiencies in ESG ratings.

When considering the uncertainties related to ESG, investors capability to analyze the actual costs, and net profits/losses of the long-term ESG investments, considering the whole life cycle of the projects, remains unclear. This can create inefficiencies on the decision-making process, if stakeholders' demand for sustainability engagement without understanding the economic details of the investment project. The cost structure of sustainable investments must be well analyzed before making the investment decision and communicated to the stakeholders. Additionally, the unexpected costs related to regulatory requirements and continuous research and development should be cleared out to the public. ESG innovations need new components and repairs to continue functioning like any other equipment.

Alongside costs, the energy efficiency of sustainable innovations remains questionable in the bigger picture. The usefulness and efficiency of ESG innovations can cause people to use the energy-efficient version of a product quantitatively more than the original energy-intensive model. Thus, sustainable products can increase overall energy usage. A noteworthy example is the digital economy, which plays a key role in ESG-related goals of energy consumption and climate change. For example, Gao and Peng (2023) found that digital economy innovations significantly increase urban energy consumption in China by attracting consumers to use more electronic devices for their practicality.

Sustainable innovations such as wind turbines and electric cars are examples of ESG innovations with component and cost disputes. Wind turbines are often placed in offshore locations, making maintenance and repair accessibility complicated, which raises the cost of items (Aflaki et al., 2024). At the end of the wind turbine lifecycle, which is only an average of 20-25 years (The Renewable Energy Hub, 2024), wind turbines need to be dismantled from visible parts to underground cables, deliver the components from the locations into transfer stations, and ensure proper recycling and disposal. The cost-

effectiveness of wind turbines has faced new challenges with their increased popularity, which has led to them being built in places where the wind is not as strong or continuous in the same way as on the coast. In such environments, the net yield of wind turbines is at risk as the amount of energy produced over the service life is even lower, and the costs remain roughly the same.

At the moment, truly ecologically sustainable renewable resources that would simultaneously yield economically satisfactory positive returns do not exist. For example, Finnair (n.d.) sells the carbon footprint offsetting service based on the claim that increased usage will reduce costs in the future. Given the low availability of renewable petroleum, Finnair's statement on the subject seems irrational. Currently, there is a lack of universal measurement for carbon footprint, and logistic companies are not considering all emissions from their operations comprehensively, which makes it even more questionable if any of the sustainability-related indicators rest upon verified facts or only weak, uncertified calculations. These matters provide crucial evidence of the uncertainties of ESG engagement and support claims against the embellished image of ESG investments.

When analyzing the broad scale of sustainability and value creation, there does not seem to exist a completely effective strategy or operative framework to create value both ecologically and economically simultaneously. Organizations and governments driving the phenomenon have created an unrealistic picture of the prospects of sustainability and the chances of succeeding in reaching the goals without having to desist from the current yield level. These observations are important considering the H_1 of this thesis, since in areas where ESG issues are not considered important, e.g., due to their ineffectiveness (Flammer, 2021), long-term sustainability investments are not profitable for increasing companies' market value. This is logical because investments that are not considered important or productive do not create value, but rather waste resources.

3.4 ESG ratings

ESG ratings can be issued by numerous rating agencies that analyze companies to give a comprehensive outlook of the current ESG engagement, prospects, and threads, also considering the industry, competition, and market environment. The analysis is often based on data and information provided by the company under rating.

Using different rating methodologies, agencies weigh the factors affecting the rating differently. For example, Morningstar Sustainalytics' rating methodology consists of systemic, idiosyncratic, and material ESG issues alongside stakeholder and corporate governance. The material ESG issues account for approximately 50 % of the rating (Morningstar Sustainalytics, 2024). Conflictingly, the MSCI ESG Score includes an assessment of 33 ESG key issues related to each of the ESG pillars (MSCI, 2020). The scoring methods are described in a noncommittal way, and the exact calculations are not disclosed, which negatively impacts the transparency of the ratings. While the ESG ratings can be allegedly used as value creation tool, the discrepancy among agencies can be harmful. For example, Wang et al. (2024) found that higher disagreement on companies' ESG rating results in lowered stock returns through, e.g., decreased trading activity, mainly driven by the disagreement on the performance of the governance pillar.

The ESG rating scheme shows similar characteristics to the MBS and CDO rating plot, which resulted in financial crisis in 2007. At least part of the same rating agencies providing ESG ratings today were providing MBS and CDO ratings during the early 2000s. Back then, the rating agencies were falsifying the ratings for profits, and the more they were paid, the better ratings they provided. Additionally, the MBS and CDO rating methodologies were complicated and classified, making it possible for the rating agencies to hide economic facts of the investments which diverged from the ratings. Given the attention ESG ratings have achieved while having lack of official measuring framework, the vagueness seems intentional and repetitive. These matters create the foundation on why ESG ratings are not used in this study, and the following subchapter describes the alternative approach in more detail.

The issue of the ESG ratings is ternary. First, the non-existence of universal grading for ESG performance, which makes it difficult for companies to compete with their engagement, for analysts to give out comparable company analysis, and for investors to find dependable and unbiased information on companies' sustainability. Secondly, there exists confusion around the terminology, and depending on the context, sustainability can refer to strictly climate-related matters or comprehensive sustainability, including financial, human, and climate health (Starks, 2023). Thirdly, companies can control the information on which the rating is based. This increases risk for the rating to be mendacious. Rating agencies can use companies' own, voluntarily made ESG reports as a part of the evaluation process. In many regions globally, there is no legislation or auditing requirement on voluntary ESG reporting, which increases the possibility for companies to include false information.

Companies globally have variable accounting, financial, and corporate governance regulations, which all impact the information the year-end statements contain. Thus, rating agencies cannot provide ESG ratings based on consistent metrics. In addition to voluntary ESG reporting, altering the company facade by, e.g., changing the logo to green colors can have an impact on their rating. These practices are part of greenwashing, which was discussed more in detail in chapter 3.3. Lastly, considering the matter that companies order the ratings themselves, the risk of bribery and, thus, biased ratings are inevitable.

3.4.1 An alternative measure for sustainability performance

In June 2016, a year after the SDGs were released, the United Nations Sustainable Development Solutions Network with Bertelsmann Stiftung, released the Sustainable Development Index rating, which ranks all countries with available, required data on their performance on the 17 official SDGs (Sustainable Development Solutions Network, 2016). While ESG ratings are for both companies and countries, the SDG Index rating focuses only on rating countries. Companies carry out a significant part of countries'

output and performance, which is why the SDG Index rating, despite being a country-level measure, should correlate with companies' performance in that country.

According to the Sustainable Development Solutions Network (2024), the SDG Index rating consists of calculating countries' performance on each of the 17 goals separately on a scale of 0 to 100. The rating on each goal is based on countries' performance progress towards the goal, and by collecting the data from international data providers, the comparability of the data on a global level is guaranteed. The data is collected from several international organizations, each specializing in the topic of the sustainable development goal in question. The data providers include the World Bank, WHO, UNICEF, Gallup World Poll, and the World Justice Project, among others (Sustainable Development Solutions Network, 2024). The rating process with details is publicly available on the Sustainable Development Report webpage, which enhances the transparency and trustworthiness of the rating process in addition to the Index ratings themselves. Thus, SDG Index rating does not share same issues with ESG ratings discussed in chapter 3.4.

ESG is a framework for companies to achieve SDGs (Sustainalytics, 2023), and companies' performance in ESG impacts the country's SDG Index rating. ESG rating has been found to positively impact firm value through different channels when used correctly (e.g., Giese et al., 2021; Yu & Xiao, 2022; Bellandi, 2023). In this sense, it seems reasonable to expect that SDG Index rating would impact on firm value, by increasing it when SDG Index rating is higher.

Bauer et al. (2021) conducted a survey on a pension fund's clients regarding whether the pension fund should increase the sustainability performance of the companies to invest in. The pension fund's investment portfolio was screened based on the investee companies' performance on four selected SDGs, with high performance resulting in increased capital allocation, aligning with the survey results. 74,4% of respondents voted for screening, indicating trust in SDG ratings. Even though the survey used ESG engagement and SDG performance as synonyms, which they are not, it was emphasized that SDG

screening includes engaging with the investee company and “personally” ensuring that they work in alignment with the SDGs. This emphasizes the true interest in the reliability of company SDG performance, rather than solely trusting information on voluntary sustainability reports or ESG ratings.

Fama and French (2007) examined investor preferences impact on asset prices and created a framework related to the subject. Based on their output, Cornell (2021) presented that increased interest in profits exceeding capital gains among most market participants reflects a higher demand for sustainable companies, resulting in increased stock prices. This supports the suggestion that a higher SDG Index rating correlates with capital allocated to sustainable investments, increasing firm value. If market participants, or citizens, do not value sustainable development and ecological benefits, allocating capital towards those would be seen as a waste of money and decreased firm value.

Despite SDGs focus on global societal problems to be dealt with on a country-level basis (Delgado-Ceballos et al., 2023), ESG comprehensively supports companies in integrating sustainable actions into business operations for companies to contribute to the common goals. Thus, while SDG rating is, at least for now, available only for countries, the goals are targeted at nations, people, and organizations, all having important roles in reaching the goals. Focusing on SDG performance analysis could be more reliable as ESG aims to help companies achieve SDGs. Considering the strong connection between ESG ratings and SDG Index Rating discussed in this subchapter creates support for this study's motive to replace ESG rating with SDG Index rating (combined with capital allocation) when examining commitment to sustainable development on a company- and country-specific basis. The comparison of ESG Ratings and SDG Index Rating is presented in Table 1. The SDG Index rating is used in the empirical part of this thesis, and its suitability in further usage discussed in the results.

Aspect	ESG Ratings	SDG Index Rating
Purpose	Evaluate how companies manage risks and opportunities related to ESG*	Assess and rank countries' progress toward achieving the United Nations' SDGs
Focus	Company-level	Country-level
Providers	MSCI, S&P Global, Sustainalytics (among others)	Sustainable Development Solutions Network
Methodology	Depends on the provider; mix of qualitative and quantitative data analysis. Methodologies detailed descriptions not publicly available.	National data to assess progress on SDGs with quantitative indicators. Methodology process publicly available.
Data Sources	Companies voluntary and legislative disclosures, third-party reports. Not all sources are described in detail.	Publicly available national data, government reports, international organizations.
Output	Depends on the provider; numerical scores or letter grades	Numerical score from 0 to 100
Audience	Investors, analysts, all financial market participants	Evaluating and comparing countries' progress on global sustainability targets
Limitations	Lack of standardization across providers, focus on financial materiality	Data gaps which limit score calculation to a few countries (currently available for 167 out of 193 countries globally)

*According to the United Nations Development Programme (2024), "Incorporating ESG helps companies rethink their values and align business strategies with the sustainable development goals."

Table 1 Comparison of ESG Ratings and SDG Index Rating

4 Dividends and valuation

In the financial world, many different methods exist for company valuation and value creation. Although most used methodologies have been presented in the literature several years or decades ago, new methodologies are suggested as the research and development in the field continue. For example, dividends as long-term CFs have been considered an important factor of company value (Gordon & Shapiro, 1956; Walter, 1963) for decades, whereas profits from sustainable investments have been acceleratingly being as a measure for long-term value creation only for the past decade.

Dividends are a method of distributing company profits to shareholders in form of CFs, and the payment is usually decided by the board of directors. The role of dividends is related to the time value of money (TVM), a concept that the principles of finance cover, according to which money can be worth more today than tomorrow, depending on the earning potentials and options available. In general, the payment decision and the amount are impacted not only by the company's profitability, retained earnings, and overall financial health but also by investment plans and estimations of future CFs (Brealey et al., 2014, p. 400). Thus, there can be significant differences on the dividend payout across different sized companies.

Dividend payment can change on a yearly basis, yet many companies follow a certain dividend policy for longer periods. Dividend payments can also be desired as a signal of financial state and as evidence of profitability (Roe, 2018). Despite the option to change dividend payment short termly, according to Graham (2022), dividend payment decision is originally made based on the assessment that the financial state of the company sustains the payment for longer period. Based on Graham (2022), most companies do not use dividends for signaling but rather to maintain their position in the financial markets or to enhance it.

According to the shareholder theory (Friedman, 1970), companies' main goal is to maximize shareholder wealth. Public companies' stocks are held by individual and

institutional investors, and they have periodically been found to have dissenting views on the distribution of profits (Pozen, 2015). Additionally, research has found that the greed for short-term dividend payout costs them in the long run (e.g., Emanuele et al., 2021), as reinvestments within the company have been found to yield higher average profits in terms of company value (e.g., Modigliani & Miller, 1961; Emanuele et al., 2021). These matters may complicate the dividend payment decision.

4.1 The fundamentals and role of dividends

In the early years of the stock exchange, long-term investments and their potential of growing shareholder wealth in terms of capital gain through value growth of the company were not as common as dividends. From 1802 to 2002, 5 % of the total return of 7.9 % from U.S. equities came from dividends (Arnott, 2003). Thus, dividends were the main source of equity returns.

If reinvestment opportunities and growth prospects are weak, paying dividends can be a better investment for the company in terms of firm value. For example, in declining markets, dividend-paying stocks are found to outperform non-dividend-paying stocks (Fuller & Goldstein, 2011; Goldstein et al., 2015). Of course, the state of the company can explain why dividends are not paid - growth companies aim to grow as much, quickly, and efficiently as possible, and therefore, all profits are reinvested (Brealey et al., 2014, p. 83), while value companies are known for their stable stream dividend payments. The most profitable and satisfactory option can be a comprehensive focus on either dividend payout or reinvestments, or a mixture of the two.

Dividends play a crucial role in investors' holding period return (HPR), security analysis, and investment attractiveness of the company, which further affects the appreciation of the stock temporarily (Baker & Weigand, 2015). The motivation behind continuing dividend payments at all costs can be founded on the desire to serve shareholders' wishes

and avoid sending wrong or damaging signals to the market, in addition to maintaining the stock price of the company (Graham, 2022).

From the viewpoint of financing, if fewer dividends are paid, companies can obtain more stable and good financial standing, lowering their cost of debt. With higher retained earnings, more internal financing can be used in new projects, although debt financing can be more reasonable at times compared to self-financing due to, e.g., leverage effect. Simultaneously, higher indebtedness can raise the cost of debt and the risk of investment. At times of financial distress or earning shortages, financial leverage might be used to finance the yearly dividend payments, especially if the shareholders' trust in stable and continuous CF is otherwise at stake, not to mention the possible decrease in company market value due to market participants' decreased trust towards the company's ability on creating future profits. This chain reaction highlights the role of dividend payment in companies' financial decision-making and firm value.

Despite arguments on the irrelevance of dividends discussed first by Modigliani and Miller in 1961, Koijen et al. (2018) speak for the importance of dividends and examine the concept of carrying different asset classes. In global equities, carry is usually present as dividends, offering a significant predictive valuation tool for equities. Instead of predicting future CFs from past values, equity carry utilizes futures contract information to assess future dividends. Emphasizing dividend relevancy, it is found that dividends are not as vulnerable to market exposure. By implementing a carry strategy in the market, investors can make the best out of dividends, as the compensation for risk is relatively higher compared to common passive investments.

The predictive power of carry is credible as the futures prices provide market participants with expectations about future price movements and appreciation of the underlying asset. Carry provides an important tool for companies to attract investors, offering convincing information about future profits without a need for a specific asset pricing model (Koijen et al., 2018), compared to uncertain sustainable investments. Additionally,

if a company has already invested in sustainable projects, profit expectations can be embedded into the futures prices and, thus, into the carry.

While dividend payment has a strong long-term perspective (Graham, 2022) and their importance in value creation is justified on, e.g., the PV formula, they are still often characterized as short-term profits. The motives and consequences of short-termism are widely discussed and disputed topics in the financial world, notwithstanding that the definition of the term varies. The CFA Institute defines short-termism as "an excessive focus on short-term results at the expense of long-term interests" (CFA Institute Research and Policy Center RPC, 2019). Short-termism is often discussed as a restrainer or impediment to long-term value creation of the whole environment.

Fried and Wang (2019) found that short-termism and the impact of dividend payout to shareholders are measured improperly, which easily falsifies the actuality. Accordingly, dividend payout is often analyzed without considering direct and indirect equity issuances and equity capital inflows. It seems like the strong long term viewpoint sustainability has, in addition to the longer time it takes for sustainable investments start to yield, has falsified investors views on dividends which are paid yearly. However, I know from Graham (2022) that companies' and their managers make short term changes with long term attitude – companies are motivated to pay dividends especially to create value and ensure position on the market long term.

4.2 The impact of sustainability and dividends on company valuation

Several factors should be considered when evaluating company value. First, the methodology used in the calculation should be chosen depending on the aims of the analysis and the viewpoint (market value or accounting-based value). Second, different strategies and capital structures of companies should be considered to maintain the comparability of the results. For example, growth companies often have a high leverage for initial investments, while value companies have a stable, long-term dividend policy.

Three of the most common company valuation methods include the weighted average cost of capital (WACC), Tobin's Q, and general DCF models. Only three valuation methods are discussed in this chapter to explain the impact of sustainable investments on firm value in a compact but comprehensive manner. Additionally, the selected methods are meaningful from the viewpoint of dividends and sustainability, and thus, the aims of this study.

WACC is a valuation method that reveals the average cost of capital for company financing. When making investment decisions, WACC should be considered as the returns should cover the capital costs. From the viewpoint of an investor, WACC tells how much the company pays for its funding through shares. WACC can also be used to evaluate projects and is often used as a discount rate for future CFs (Brealey et al., 2014, p. 480). The WACC formula (with taxes) is as follows:

$$WACC = r_D(1 - T_C)\frac{D}{V} + r_E\frac{E}{V} \quad (3)$$

Where WACC is the weighted average cost of capital, r_D is the cost of debt, $(1 - T_C)$ is the company tax rate, E is total equity, D is total debt, r_E is the cost of equity, and V is the total value of the company in terms of $E + D$. ESG and company sustainability investments can have a significant impact on WACC. Firstly, the tax rate can rise or decrease depending on the emissions and energy usage of companies (KPMG, n.d). Secondly, ESG has been found to lower the cost of debt through, e.g., lower risk of bankruptcy and increased transparency, enhancing reputation and, thus, social capital (Li et al., 2024). Additionally, Alves and Meneses (2024) found a negative connection between ESG performance and the cost of debt. The findings of Alves and Meneses prevailed that the companies with larger problems in terms of agency costs or total debt benefit from ESG performance the most.

As there exist controversies regarding ESG ratings, the impact of ESG ratings on the cost of debt should be reviewed with caution. ESG covers publicity and reputation management through the disclosures released regarding the sustainable actions of the company, and reputation has been found to impact the cost of equity (Becchetti et al., 2023). This is connected to the institutional theory, suggesting that government arguments impact market participants' expectations of companies. If sustainable matters are ignored, investors might associate the company with higher risk and, thus, have higher return demands.

The impact of dividends on WACC comes through the cost of equity. Higher risk is generally expected to arrive with higher profits, creating expectations from the market towards companies. Regarding the cost of equity, dividend payment can have a negative impact in countries where dividends are taxed with a higher percentage compared to capital gains. The cost of capital is connected to the level of investment, as high costs require higher profits from the projects. When costs are high, otherwise profitable investments can be turned down, resulting in decreased capital gains and reduced innovation. Research and development, followed by profit expectations form a significant part of a company market value. For example, Carluccio et al. (2023) found that investment level decreases by 0,7 percentage points when the cost of capital measured with WACC increases by 2 percentage points.

Tobin's Q, which was presented in practice by James Tobin in 1970, calculates PVs of investment to cost ratio (Bodie et al., 2023, p. 539). Literature has found that Tobin's Q can predict average stock returns well, in addition to indicating the discount rate of investment projects. According to Bodie et al. (2023), discount rates are strongly connected to the valuation of assets. Tobin's Q can also be considered a good indicator of the profitability of investment projects and, thus, company value. Since the replacement cost of assets can also be measured with Tobin's Q (Bodie et al., 2023, p. 831), it is especially suitable for industries where the asset structure consists of large amounts of

physical assets (Rahat & Nguyen, 2024), furthermore, assists companies with strategic decisions regarding, e.g., investments. Tobin's Q can be calculated as follows.

$$Tobin's\ Q = \frac{market\ value\ of\ equity + total\ liabilities}{total\ assets} \quad (4)$$

Where the market value of equity is market capitalization, total liabilities are the sum of short and long-term liabilities, and total assets are the book value of total assets from the balance sheet. In the formula, the replacement cost of equity is often the denominator, but due to its difficulty in estimation, it is commonly replaced with total assets.

Dividends impact companies' CF expectations from shareholders viewpoint, and the numerator component of Tobin's Q, the market value of the company measured as current stock price times the number of outstanding shares, consider the CF effect of dividends (Chen et al., 2013). As mentioned, in valuation, all that matters are CFs, rates, and time. This is because CFs drive the profits from investments, and time impacts the prospects of the profit growth related to TVM. The role of dividends is also emphasized in globally acknowledged financial theories, such as the dividend relevancy theory discussed in chapter two.

The trustworthiness of the company board influences the market value of equity as unreliable management can impose a risk on shareholders' wealth maximization (Jensen & Meckling, 1976). However, dividends have been found to reduce agency costs (Wang et al., 2022; Kapons et al., 2023), which is why dividend payments in mature listed companies can enhance investors' trust, positively impacting stock price and Tobin's Q. The amount of dividend payment impacts on total assets/liabilities of the company since if part of the profits is not distributed through dividends, the sum can be added to the retained earnings.

Sustainability and ESG reporting have been found to impact the market value of equity in terms of, for example, enhanced company image associated with increased interest of

investors (also related to SRI) and decreased risk (e.g., Giese et al., 2021; Chiaramonte et al., 2022; Devine & Yönder, 2023). Furthermore, sustainability engagement can impact companies' asset value through lower cost of capital (Li et al., 2024; Alves & Meneses, 2024).

The general DCF model is one of the three main approaches to determining a company's intrinsic value. It is based on evaluating incomes (Abbas Rizvi et al., 2022). DCF is one form of PV, but it is more suitable for company valuation because it assumes the discount rate will remain constant (Brealey et al., 2014, p. 83). General PV is commonly used for estimating the value of a single project and its CFs, often with changing discount rates. Despite not being in the formula, capital gains are considered in the valuation indirectly, as it is assumed that the estimated CFs are included in the stock price (Brealey et al., 2014, p. 83). The general DCF model is presented as follows.

$$DCF = \sum_{t=1} \frac{CF_n}{(1+r)^n} \quad (5)$$

Where CF_n is the estimated CF at time $t = n$, and r is the discount rate. DCF is properly suited for companies that do pay dividends, yet it is still useful for investors to analyze whether a company should continue dividend payments (considering company valuation) or switch them to reinvestments. From the ESG viewpoint, sustainable investments can have a comprehensive impact on future CFs, regarding, for example, cost and energy effectiveness. Additionally, sustainable investments and their CFs generally have lower discount rates, included in the DCF model and CF valuation.

Dividends are directly related to the DCF model as they form the CFs from investments for investors. When evaluating the return rate of investment, which is one of the two principal rules in the investment decision process (Brealey et al., 2023, p. 28), the amount of dividends relative to the initial investment is analyzed. Thus, dividends and their opportunity cost of capital are in the interest of investors, which, again, is directly connected to the attractiveness and value of the company. Additionally, the DCF formula

is part of the NPV calculation, which is used alongside the rate of return when making investment decisions. Of course, CFs from investments can come in another form than dividends, but to maintain the consistency and simplicity of this thesis, the CFs in terms of dividends are held as the focus, mostly due to their practical characteristic.

When examining the three main models for calculating the value of a company and the impact of the two key variables in this study on those models, an influence relationship exists. The strength of the influence depends on several factors, including other inputs and variables in the models, their interaction with sustainability engagement and dividends, and company-specific differences. These observations support the motives of this thesis to analyze the connection of the two key variables of interest on firm value more in detail, also considering the possible differences in capital allocation decisions among sustainability investments and dividend payout.

5 Literature review

This chapter presents and discusses literature examining the balance between long-term sustainable investments and dividend payout, capital allocation decision-making, and their impact on firm valuation. Previous literature focuses on differences among stakeholders' preferences, issues related to sustainable performance measuring, and optimal strategies for firm value maximization. The reviewed literature generally considers ESG ratings as a reliable measure, which is not in alignment with the approach of this thesis. Therefore, the results of previous literature should be interpreted with caution. However, the findings can be utilized when analyzing the results of this study and validating whether ESG ratings could be replaced by SDG Index ratings and their interaction with companies' financial decisions.

5.1 Firm value and sustainability

Devine and Yönder (2023) examine the effect of sustainable investment on related CFs and valuation of companies by evaluating U.S real estate investment trusts (REITs). The structure of REITs, their business operations, and expected payouts create an optimal research object to examine sustainable investments' impact on both returns and company performance (Devine & Yönder, 2023). Using building certification data of REITs' building investments, the authors create a Green Share value that divides REITs' sustainable investment scores into levels "Certified", "Silver", "Gold", and "Platinum", with Certified being the lowest and Platinum the highest. Then, the firm performance and marginal impact of sustainable investment are observed from REITs with different Green Share values.

The results show significantly higher yields related to rents and net operating incomes when Green Share obtains a greater value with insignificant increases in nominal, general, and administrative expenses (Devine & Yönder, 2023). Thus, REITs with more sustainable investments can make more profit while expenses remain relatively the same

level as REITs with more unsustainable investments. The authors show that the company value measured with the price-to-net asset value (NAV) ratio increases relative to the Green Share value, encouraging companies to sustainable investments over unsustainable ones. Sustainable investments are cost-effective in the long run, which is visible in the results as lowered volatility and turnover ratio for REITs with higher Green Share value compared to the S&P500. The results are robust to companies lacking sustainable investments. The authors highlight that their results offer crucial evidence of the benefits of sustainable investments and their long-term positive impact regarding the ongoing global change and its changing regulation. Companies not engaged in sustainable engagement and investments might face rising costs of debt and difficulties in accessing financing shortly as the knowledge and valuation of sustainable investments accelerate.

In the context of firm value and capital allocation decision-making, the results of Devine and Yönder (2023) indicate that long-term sustainable investments should be prioritized, as cost savings and risk management impact significantly and positively on firm value in the long run. However, it should be noted that the authors do not take a stand on the differences in perceptions of sustainability and climate change across countries but rather assume sustainability is viewed as crucial globally.

Fama and French (2007) examine investor preferences impact asset prices and created a framework related to the subject. Based on their output, Cornell (2021) argues that increased interest in profits exceeding capital gains among most market participants reflects a higher demand for sustainable companies, resulting in the increased stock prices of such companies. Profits exceeding capital gains include, for example, charity and decreased carbon emissions. This supports the suggestion of this thesis that a higher SDG Index rating correlates with capital allocated to sustainable investments, increasing firm value. Despite the lowered return expectations regarding capital gain, Cornell (2021) suggests that companies emphasizing sustainability investments achieve an increase in firm value due to investors' preferences.

Considering Fama and French's (2007) framework and Cornell's (2021) findings, the relationship between investor preferences, sustainability investments, and firm value can be viewed from the opposite direction as well; if market participants or citizens do not value sustainability development and ecological benefits, allocating capital towards those would be seen as a waste of money and decrease firm value.

5.2 Capital structure and impact of operating environment

Bellandi (2023) examines the optimal target and level of financial and sustainable growth from companies' perspective to maximize the profits of the company itself, in addition to serving different stakeholders' desires. Bellandi (2023) argues that serving stakeholders' wishes is not always simple, moreover, they are not necessarily in line with management's preferences. Thus, finding the equilibrium between financial and sustainable growth in financial and operational decision-making is something companies should analyze more.

According to Bellandi (2023), nonparticipation in sustainability has a considerable effect on firm value through stakeholders, who easily vote with their feet and sell their holdings. Such losses in value can exceed the financial profits gained from choosing an unsustainable investment and result in worse outcomes than originally expected (Bellandi, 2023). Thus, despite the existing criticism of shareholder and stakeholder theories, Bellandi suggests them to be tenable.

Bellandi (2023) creates a financial/ESG sustainable growth matrix model, which presents different outcomes of companies engaging with ESG differently. Accordingly, companies that do not consider optimal growth plans, including sustainability, industry environment, and competition, can result in a lower return on investment, increased debt-to-equity ratio, cost of debt, and effective tax rate, among several other things (Bellandi, 2023). This effect underlines the importance of balancing companies' investments between sustainable and unsustainable options.

On the contrary, Bellandi (2023) recognizes that “unsustainable” growth of companies through, e.g., increased usage of leverage in cash investments, can result in higher actual growth at the expense of sustainable growth. This scenario can be optimal if the company itself does not value sustainability in addition to its stakeholders, although regional and global regulations can cause penalties and costs to unsustainable companies. The question of whether such costs would exceed the actual growth achieved should be analyzed on a case-by-case basis.

Finally, Bellandi (2023) points out that firm value does not move in the same direction as actual growth due to differences in the weight and impacts of the components driving the different valuation methods. Bellandi (2023) suggests that stakeholders‘ expectations regarding the relationship between financial profitability and sustainability should be analyzed more to achieve the equilibrium between sustainability engagement, financial performance, and, finally, higher firm value. When the market’s preferences are recognized and an optimal capital allocation equilibrium is found, the positive effects are boosted if the strategy is used consistently.

Casciello et al. (2024) examine the influence of green innovation on company performance valuation from both accounting and market-based measurements. The aim is also to determine the differences in the channels through which green innovation impacts performance valuation comes from R&D expenditures and the extent of ESG disclosure. The authors discuss the differences in the impact of sustainability engagement on accounting-based and market-based financial performance measures. Most importantly, they emphasize that the channel through which sustainability engagement impacts these two measures is different, and when the difference is not recognized, it can significantly alter the results and market participants’ views of the state and value of the company.

Analyzing both accounting-based and marked-based measures gives a more detailed and comprehensive outlook on the company's state, while alone, they only provide a partial view (Casciello et al., 2024). Thus, the lack of determination and usage of both measures and their relationship with sustainability engagement can result in the misevaluation of companies, their prospects, and value.

By evaluating the level of green innovation through the Environmental Innovation Score from Refinitiv, the authors find that increasing engagement in green innovation negatively impacts accounting-based financial performance measures, while the impact is positive on market-based measures, such as Tobin's Q. The level of green innovation is found to increase companies' ESG disclosure, which has been found to positively impact company value. This highlights the importance of real, practical actions on sustainability over ostensible engagement and greenwashing.

The finding regarding the negative relationship between green innovation and accounting-based financial performance measures is not surprising considering the initial investments, longer payback period, and uncertainty of sustainability-related investments. This is supported by Duque-Grisales and Aguilera-Caracuel (2021), who found that the negative impact of ESG on companies' financial performance can arise from the deficient implementation of the initiatives, reflecting inefficient capital usage and decreased financial performance.

The authors recognize the issue of balancing short-term expectations and longer-term goals while highlighting the importance of communication with their stakeholders. Communication can prevent confusion and misunderstanding on how companies operate according to their stakeholders' preferences and decrease information asymmetry. This, in turn, impacts the reputation and social capital of companies. The recognition of shareholders' preferences, opportunities, and threats of short-term profits and long-term value creation, both economically and ecologically, and the optimal strategy definition is at the core of the subject. Casciello et al. (2024) argue that after defining the company

strategy as comprehensively as possible, consistency finalizes the prospects of performance maximization. These observations are in line with the ones made by Bellandi (2023).

Wang et al. (2022) examine the environmental issues that impact on dividend payout. Their motivation for the study is in line with Bellandi (2023), as Wang et al. (2022) argue that acknowledging the company's operating environment plays a crucial part in financial decisions. The operating environment develops partially according to stakeholders' preferences, which impacts companies' business strategies. These observations support the interaction with SDG Index rating and companies' sustainability performance discussed in chapter 3.4.1.

If company management is unwilling to engage with sustainability while the local market participants prefer so, the contradiction can result in a decrease in firm value. This arises from the impact of companies' reputations on their social capital and decreased competitive advantages. Thus, companies can be forced to change their policies according to market environment preferences. Social capital can be controlled with impression management, which includes analyzing the company's state in the location environment, industry image, and expectations of competitors' future behavior.

Wang et al. (2022) examine the impact by reviewing the local area air pollution level's relation to dividend payout, creating a location greenness (LG) measure, and comparing it to the level of paid dividends in different areas. It is predicted that in areas with low air pollution, interpreted as low LG, companies pay fewer dividends compared to those operating in more polluted areas. This could be explained by low LG areas having more pressure to enhance their reputation by paying more dividends to the shareholders, compensating for the area's adverse air quality even when they would not be polluters themselves (Wang et al., 2022). Simultaneously, high LG firms are keen to invest in more sustainable matters at the cost of paying fewer dividends to shareholders. If engagement to sustainability is high, this should result in an improvement of social capital and firm

value, as such investments in greener areas are anticipated by the shareholders (Wang et al., 2022).

Wang et al. (2022) succeed in confirming their predictions. Despite the company's growth potential, the economic situation in the operating environment, institutional ownership, and local and global regulations of dividend policy and sustainability, companies operating in less polluted areas pay fewer dividends. This shows considerable evidence of the financial decisions regarding payout decisions made in the company management, as high LG companies seem to consider the environment and the company's location in it from a different angle compared to ones with low LG. The findings support the suggestion of this thesis to use SDG Index rating and its' interaction to companies' decisions, further impacting firm value. By doing so, market environments' impact is captured more precisely compared to ESG rating.

5.3 Paying dividends while investing in green transition

To understand the importance of allocating capital to both dividends and CSR, Seth and Mahenthiran (2022) examine the trade-off between these two, the factors that impact the decision-making process, and the motives behind different choices and their consequences, focusing on company value. While their sample is restricted to Indian listed companies with different managerial structures, the aim is to find the benefits of CSR performance (measured with ESG ratings) and dividend payout.

By performing a regression where Tobin's Q is the dependent variable and dividend payout and ESG ratings are the independent variables, Seth and Mahenthiran (2022) made interesting results. Most importantly, they found that CSR engagement works as a complement rather than a substitute to dividends, supporting the argument that finding a balance between these two should be the optimal choice in terms of firm value. Both CSR and dividends are tools for signaling the state of the company, and despite their

different viewpoint, they are both important regarding the market participants' interests when evaluating companies.

The signals provide information about the company's state in both economic and ecological terms. However, companies need to recognize the preferences of their stakeholders to use the two different signaling channels efficiently, as sustainable investments and disclosures create costs, while paying dividends can also be an inefficient use of resources if investors do not appreciate them properly.

One of the reasons why dividends and CSR engagement work profitably together is related to the principal-agent problem and information asymmetry between the company and its stakeholders. These matters are directly connected to the company's reputation, efficient usage of capital in terms of profits, and, thus, company value. Furthermore, the authors emphasize the role of CSR disclosure in convincing stakeholders of CSR engagement. Considering this finding, the question remains whether the issuance of CSR disclosure is a reliable signal. The disclosures are often only promises and plans regarding sustainable operating strategy, which are hard to fact-check due to the optional nature of reporting the progress. Thus, there exists a risk of companies misusing CSR disclosures and greenwashing. This, in turn, is not sustainable growth in the long run.

5.4 Summary of previous literature

To summarize, the previous literature provides further support for the connection between dividends, sustainability engagement, and company value. The literature underlines the importance of balancing the capital allocation decision-making process between long-term investment and short-term profits.

Considering the aim of this study to replace the ESG ratings with the SDG Index rating and reported environmental expenditures is not in line with the previous literature, the positive association between company value and SDG Index rating cannot be directly

supported, as mentioned at the beginning of the chapter. Despite the restrictions of ESG ratings often recognized in the previous literature, ESG ratings are still used in the regression, which may negatively impact the results obtained in the previous literature. However, when considering both the positive association found in the literature between ESG and company value and the association between ESG and SDG Index rating discussed in chapter 3.4.1, a connection between SDG Index rating and company value is still expected. The literature emphasizes that the impact of sustainability engagement on company value is positive mostly from a long-term perspective, highlighting the importance of analyzing the change in company value only several years after the initial sustainable investment is made.

Finally, in the previous literature, the societies' perceptions of climate change are a significant factor in sustainability engagement and company value. This finding supports the idea that the SDG Index rating plays a significant role in building a company's value, as it reflects society's commitment to sustainable development, thereby influencing the motivation and social pressure faced by companies. Most importantly, leaning on the shareholder and stakeholder theories, the impact of long-term sustainability investments and dividend payout on company value is significantly dependent on the preferences of stakeholders.

6 Methodology and data

This chapter presents and defines the data used in this study's empirical part and describes the study's methodology. The sample was mostly selected based on their environmental expenditures and environmental R&D expenditures spending, while control variables and methodology follow closely studies by Bose et al., (2022), Chen and Dagestani (2023), and Rahat and Ngyuen (2024).

6.1 Methodology

The impact of sustainable investments (measured by environmental expenditures) and dividend payout on firm value is tested with ordinary least square (OLS) regression, following Servaes and Tamayo (2013), Bose et al. (2022), Chen and Dagestani (2023), and Rahat and Ngyuen (2024). The regression is conducted with all sample countries together to capture the possible impact of different capital allocation structures between long-term sustainability investments and dividend payout to firm value to test the H_1 of this study. OLS works as a base model to capture the relationship between independent and dependent variables. Do address any potential heteroskedastic issues and serial-collinearity, robust standard errors are used. The OLS model is formulated as follows:

$$\ln Tobin's\ Q_{i,t} = \beta_0 + \beta_1 \ln EnvExp_{i,t} + \beta_2 \ln Div_{i,t} + \beta_3 \ln Lev_{i,t} + \beta_4 \ln ROA_{i,t} \quad (6)$$
$$+\beta_5 \ln Rev_{i,t} + \beta_6 \ln Liq_{i,t} + \beta_7 SDG_{j,t} + \beta_8 CPI_{j,t} + \beta_9 \ln GDP_{j,t} + \varepsilon_{i,t}$$

Where each subscript corresponds to the company i at time t, except for the country-level variables (SDG, CPI, and GDP), which are indexed by and country j at time t. The justification for using SDG Index rating over ESG rating was discussed in chapter 3.4.1. According to the previous literature, the dependent variable is $Tobin's\ Q_{i,t}$, However, as can be seen from the model, a natural logarithm is taken from dependent variable independent variables and most of the control variables due to the scale of different companies, which was detected in descriptive statistics. Independent variables are

$EnvExp_{i,t}$, the natural logarithm from the sum of environmental expenditures and environmental R&D expenditures from companies' financial statements, and $Div_{i,t}$, the natural logarithm of total cash dividends paid. Control variables are included according to table 3, expect for size which was excluded to reduce exposure to multicollinearity. β_0 is the intercept term of the model, and $\varepsilon_{i,t}$ is the error term for company data.

Secondly, a fixed effects model is used to capture any possible company-specific and country-specific effects. Testing both OLS and fixed effects further follows earlier studies (Servaes & Tamayo, 2013; Bose et al., 2022; Chen & Dagestani, 2023; Rahat & Ngyuen, 2024). The fixed effect model accounts for any possible robustness within the dataset. The fixed-effect model is formulated as follows:

$$\ln Tobin's\ Q_{i,t} = \beta_1 \ln EnvExp_{i,t} + \beta_2 \ln Div_{i,t} + \beta_3 \ln Lev_{i,t} + \beta_4 \ln ROA_{i,t} \quad (7)$$
$$+\beta_5 \ln Rev_{i,t} + \beta_6 \ln Liq_{i,t} + \beta_7 SDG_{j,t} + \beta_8 CPI_{j,t} + \beta_9 \ln GDP_{j,t} + \alpha_i + \varepsilon_{i,t} + \mu_{j,t}$$

Where the dependent, independent and control variables remain the same as in OLS (formula 6), but β_0 is replaced by α_i to account for entity-specific intercepts (the fixed effects), and $\mu_{j,t}$ represents the country-specific effects. The formulas 6 and 7 focus on the direct impact of each variable to firm value. Lastly, formula 8 below aims to capture the impact of interaction between sustainability engagement (measured by SDG Index rating) and long-term sustainable investments in addition to sustainability engagement and total dividends paid to test H_1 of this thesis. Using an interaction term further follows the methodology used by Bose et al. (2022). The last formula is as follows:

$$\ln Tobin's\ Q_{i,t} = \beta_1 \ln EnvExp_{i,t} + \beta_2 \ln Div_{i,t} + \beta_3 (EnvExp_{i,t} * SDG_{j,t}) +$$
$$\beta_4 (Div_{i,t} * SDG_{j,t}) + \beta Controls_{i,t} + \beta\ Controls_{j,t} + \alpha_i + \varepsilon_{i,t} + \mu_{j,t} \quad (8)$$

Where $(EnvExp_{i,t} * SDG_{j,t})$ is the interaction term ln environmental expenditures * SDG Index rating and $(Div_{i,t} * SDG_{j,t})$ the interaction term total ln dividends paid * SDG Index rating. As the formula 8 follows the formula 7 except for the added interaction

terms, firm-level control variables $\ln Lev_{i,t}$, $\ln ROA_{i,t}$, $\ln Rev_{i,t}$, and $\ln Liq_{i,t}$ are marked as $Controls_{i,t}$ and macroeconomic-level control variables $SDG_{j,t}$, $CPI_{j,t}$, and $\ln GDP_{j,t}$ are marked as $Controls_{j,t}$ for simplicity. Additionally, using the interaction term aims to obtain further results for the H_2, and account for the role of market environment impact on the two main independent variables.

6.2 Sample and variables

The sample of this thesis consists of European companies that have reported environmental expenditures or environmental R&D expenditures during the sample period at least once. Only European countries are used in the sample because ESG and sustainability trend has been a passing trend (Warner, 2024), especially in the U.S. after President Trump's re-election and his decisions to withdraw U.S. from global sustainability agreements, such as the Paris Climate Agreement (Byrne, n.d.). Due to developing countries low R&D and weak economic situations locally, Africa has not been able to participate sustainability engagement in a way that would be economically meaningful to serve the aims of this thesis. Lastly, Asia was not included in the sample due to the contradicting and striking opinions of their leaders on sustainability and its' importance, which makes it complicated to interpret the governments and market environment's impact on companies' decisions compared to Europe.

To capture countries' SDG Index rating's possible impact on local firms' capital allocation decisions and further on firm value, only companies listed in their origin country were included in the sample. To be more precise, a company originally from, e.g., France listed only on the German stock exchange would not reflect the local changes in France regarding sustainability regulation, as there are local policies and regulations alongside global regulation (e.g., EU regulation). By doing so, all dual-listed companies were also removed. Lastly, companies missing any variable values on the selected time frame were removed to maintain the coherence and comparability of the sample data.

Due to the voluntary nature of reporting environmental expenditures, several companies did qualify for the sample, leaving whole countries out of the sample. Out of 35 European countries and 7 429 listed companies, the final sample consists of 160 companies from 18 European countries and 15 360 firm-year observations. Table 2 below shows the distribution of companies and countries in the sample data. The sample period is from 2016 to 2023, and it is defined for two reasons. SDG Index rating, being one of the key variables of interest, is only reported from 2016 onwards, including 2024. However, the other variables in the regression, which are announced in companies' financial statements, were not published for the year 2024 at the time of data collection. Thus, the time period for the data has been selected for practical reasons, as data beyond the chosen period is not available considering all selected variables.

Country	*N*	Percent
Austria	3	1,88 %
Belgium	10	6,25 %
Denmark	1	0,63 %
Finland	19	11,88 %
France	6	3,75 %
Great Britain	9	5,63 %
Germany	10	6,25 %
Greece	1	0,63 %
Ireland	1	0,63 %
Italy	25	15,63 %
Netherlands	5	3,13 %
Norway	3	1,88 %
Poland	1	0,63 %
Portugal	1	0,63 %
Russia	5	3,13 %
Spain	43	26,88 %
Sweden	14	8,75 %
Switzerland	3	1,88 %
Total	160	100,00 %

Table 2 Country distribution of companies in the sample data

The origin countries are presented to illustrate the distribution of sample companies across the selected geographical area. By doing so, it can be noted that few countries stand up clearly, describing the motivation of companies to report sustainability matters in certain areas. Finland, Italy, and Spain make up 54,39 % of the whole sample, which may bias the results geographically.

European countries and their companies are comparable, as they are subject to binding legislation through the European Union. Despite not all European countries being members of the European Union (e.g., Great Britain and Norway), they are subject to some EU legislation through trade agreements. For example, Norway is a member of the European Economic Area (EEA), and being a member of the EEA requires the following certain EU regulations and directives, e.g., greenhouse gas emissions reduction and sustainable finance disclosure regulation (European Commission, n.d. C; Norwegian National Human Rights Institution, 2024). Without analogous regulation of sustainability (ESG-related regulation), the interpretation of the results would not be coherent, considering the aim to detect differences in sustainability performance through the number of long-term sustainability investments.

Control variables are divided into firm-level and macroeconomic-level. Firm-level control variables consist of firm size measured by market capitalization, leverage measured by total debt of common equity, profitability measured by ROA, liquidity measured by cash and short-term investments divided by total assets, and growth measured by net sales/revenues following Bose et al. (2022). To control for inflation, market situation, and local sustainability perceptions, macroeconomic factors CPI, GDP, and SDG Index rating are included in the regression. The firm-level data is collected from the LSEG Data & Analytics database (former Refinitiv), country-level data from Eurostat, and macro-level data from the Sustainable Development Solutions Network.

The selected variables follow the study by Bose et al. (2022), except for the SDG Index rating, which is not, to the best of my knowledge, been used as one of the main variables

of interest in regression context in previous literature. Additionally, due to the wide range of companies with different characteristics, natural logarithms are taken from most of the control variables to improve interpretability and reduce extreme differences between observations, diverging from the needs of Bose et al. (2022). Table 3 presents the used variables and their definitions.

Tobin's Q is used as a proxy for firm value. Tobin's Q is suitable for the objectives of this study since Tobin's Q is a forward-looking measure that reflects the market's expectations on future profitability. If long-term sustainability-related capital expenditures are high and the market is considering sustainability as a crucial matter, can it be reflected as enhanced firm value and higher Tobin's Q. The connection between sustainable investments, dividends, and Tobin's Q was discussed in more detail in chapter 4.3. The natural logarithm is also taken from Tobin's Q to address any possible measurement errors related to the variable, again following Bose et al. (2022).

Variable	Proxy for	Definition
Dependent variable		
Tobin's Q	Firm value	Ln* of (market capitalization + total debt) / total assets
Independent variables		
Environmental Expenditures	ESG-related investments and sustainable engagement, long-term value creation	Ln* of the sum of environmental expenditures + environmental R&D expenditures
Total Dividends Paid	Short-term profit distribution	Ln* of total cash dividends paid
Control variables		
Leverage	Financial health and stability	Ln* of total debt % of common equity
Size	Company scale and stability	Ln* of market capitalization
ROA	Profitability	Ln* of net income / total assets
Revenues	Business activity and growth prospects	Ln* of net sales or revenues
Liquidity	Ability to meet short-term liabilities	Ln* of cash & short-term investments / total current liabilities
SDG Index Rating	Engagement in sustainability in terms of achieving SDGs	Country SDG Index rating, yearly
CPI	Inflation	Country CPI, yearly
GDP	Economic health and market situation	Ln* of country GDP, yearly

** Ln: Natural logarithm*

Table 3 Summary of variables

In alignment with the aims of this study, the independent variables in the regression are sustainable investments and total cash dividend paid. Although sustainability and firm value have been widely studied in the literature, the challenge in selecting variables representing long-term sustainable investments was the lack of consistent and universal reporting on sustainability. The matter has also been noticed in the previous literature, i.e., Bauer et al. (2021). Measuring companies' sustainability engagement through capital expenditures on the matters was considered obligatory, considering the aims of this study. This is because the amount of money allocated to sustainability can be measured more easily compared to more traditional sustainability measures such as voluntary ESG reporting and its extent.

Considering diverging and incomprehensive measuring standards and rent-seeking behavior between companies and rating agencies (Zhang et al., 2024), ESG ratings are not considered a realistic or significant indicator of companies' ESG engagement in this study. Additionally, as the aim is to compare two different capital allocation decisions (sustainable investments vs. dividends), using the ESG rating was rejected.

The secondary aim was to measure the sustainable investments of companies that have issued green bonds. Unexpectedly, only a few listed companies by country have issued very few green bonds during the sample period 2016-2023. For example, out of all 176 Finnish public companies, only a total of 10 green bonds from 7 publicly listed companies were issued in the timeframe of 2016-2023. Based on the scarcity of available green bond data, measuring sustainable investments through the number of green bonds issued was rejected. After exploring other possible options, environmental expenditures and environmental R&D expenditures were found from the LSEG Data & Analytics database and selected for this study. Thus, the first independent variable of interest, sustainable investments, is a sum of the company's reported environmental expenditures and environmental R&D expenditures.

Some companies only report either one of these two. In this case, only the reported one is representing the sustainable investments of the company. Given the significance of these variables for the objectives of this study and the limited reporting by the sample companies, all firm-year observations with missing data for these variables are replaced with zero. This approach ensures that all companies in the sample have reported on either environmental expenditures, environmental R&D expenditures, or both. Since there is a large range between companies and observations, a natural logarithm is taken from environmental expenditures. This will allow the results to be more comparable across companies. The natural logarithm also helps to highlight the effect of the magnitude of the variable on the model; without a natural logarithm, the variable would rather capture whether capital is allocated for sustainability at all.

Reporting environmental expenditures and environmental R&D expenditures is not legislatively obligatory and they lack official accounting standards, emphasizing that the variable should be interpreted with caution. Yet, considering the investment requirements of sustainability engagement as described in chapter 3, it can be expected that higher sustainability engagement denotes increased sustainability-related capital expenditures. The connection arises from companies' willingness to improve their sustainability and ESG engagement to fulfill the desires and hopes of local investors and interest groups, aligning shareholder and stakeholder theories.

Since there is no previous evidence of the use or functionality of this variable, the results should be interpreted with special caution. Additionally, as there is no extensive evidence of a correlation between the ESG rating and the level of sustainable investments, the degree of explanatory power of the variable may be lower compared to the ESG rating in previous literature. On the other hand, companies do not spend money on sustainability investments with a company value-raising effect (in which case the variable's explanatory power would be low or statistically insignificant), it can highlight concerns about whether the ESG rating is only an ostensible commitment to sustainability.

The second independent variable, total cash dividends paid, is obtained directly from companies' financial statements. In line with sustainable investments, a natural logarithm is taken from this variable as well due to the wide range of observations, which is explained by, for example, the size differences of the sample data companies. As discussed in chapter 4.3, paid dividends are expected to impact Tobin's Q as they decrease the total assets of companies.

SDG Index ratings are hand-picked from the Sustainable Development Reports 2016-2023 published annually. The variable reflects the local opinion and engagement with sustainability, representing sample countries' market environment, stakeholders' expectations, and social pressure on sustainability engagement from the companies' viewpoint. Opinion of climate change and its risks activates governments and policymakers on the related regulation. If climate change is viewed as a considerable threat, regulation tightens. When regulation changes, companies in the area must alter their businesses to comply with the regulations, leading to (long-term sustainable) investments, and engaging with ESG allegedly results in long-term value growth for companies (United Nations Global Compact, 2004). On the other hand, negative opinion in climate change is expected to negatively influence the amount of long-term sustainable investments, simultaneously the investments having little to no impact on firm value.

6.3 Descriptive statistics

Table 4 below presents the descriptive statistics of the selected variables. The data can yield both expected and unexpected observations. As mentioned in chapter 6.2, the statistics can be biased due to the data being emphasized on three specific countries. Additionally, the size of companies is not examined in more detail, and the descriptive statistics imply that the data consists of mostly big companies rather than small and medium sized companies, which can further bias the results.

	ln Tobin's Q	ln Env. Expenditures	ln Total Dividends Paid	ln Leverage	ln Size	ln ROA	ln Revenues	ln Liquidity	SDG Index Rating	CPI	ln GDP
Min	-3.362	2.282	0.693	-2.659	9.344	-2.813	2.708	-5.398	66.4	99.174	-4.605
Max	3.275	27.445	16.456	9.744	19.263	5.883	19.669	7.532	86.8	146.269	2.755
Mean	-0.028	16.97	11.578	4.172	11.578	1.566	14.998	0.861	79.515	108.159	0.814
Median	-0.077	17.046	11.645	4.211	15.130	1.633	15.053	0.811	79.800	104.658	0.875
Std. Dev.	0.596	2.706	1.929	1.188	1.595	0.853	1.809	1.342	3.943	8.218	0.809
Kurtosis	5.867	6.779	4.73	6.12	3.068	6.005	5.783	5.061	3.134	4.601	9.481
Skewness	0.079	-0.955	-0.636	0.802	-0.248	-0.81	-0.639	0.273	0.404	1.385	-1.425
Observations	1280	823	1075	1250	1258	1140	1273	1118	1280	1280	1068

Table 4 Descriptive statistics

The mean value -0.028 of the natural logarithm of Tobin's Q indicates that, on average, companies in the sample data are nearly valued "right" on the market. What "right" means is that the valuation should be based on all available information about the companies in question, defined by the efficient market hypothesis (EMH) presented by Eugene Fama in 1970. The range of the minimum and maximum values of Tobin's Q indicates that the sample consists of companies facing different market perceptions, which can help find differences in the impact of sustainable investments (measured by environmental expenditures) and dividend payout on company value.

The skewness of 0.079 on Tobin's Q indicates that the sample consists of a few companies with significantly higher Tobin's. This is expected as the sample is relatively small, considering the number of European companies in total. Considering the selection criteria (reporting environmental expenditures) and environmental R&D expenditures, it is not surprising that only a few highly valued companies are included in the sample. The high value of kurtosis in Tobin's Q (5.867) implies the presence of outliers in the sample, making the distribution leptokurtic. The kurtosis of the sample is higher than normal distributions usually have (around a maximum of 3). The distribution being leptokurtic tells that the distribution has fat tails, highlighting the extreme values of the sample companies' value. This is not surprising, as the companies in the sample come from all size classes and industries, and thus, have diverging asset structures. These differences have been addressed by taking the natural logarithms of the variables used.

The variation in environmental expenditures is visible as a high standard deviation of 2.706, respectively. The high standard deviation implies that in the sample, a few companies allocate significant amounts to sustainable investments, whereas some allocate relatively little. This was noticed already when collecting the data, as some companies are reporting significant amounts on environmental expenditures (relative to, e.g., their market capitalization), after which they have not reported any capital allocation in the area for several years. However, some companies report stable and smaller capital allocation to environmental expenditures throughout the sample period.

Alongside environmental expenditures having a high standard deviation, total dividends paid have a standard deviation of 1.929, respectively. This indicates noticeable differences in the level of paid dividends across companies in the sample. The negative skewness of -0.0636 indicates that most companies in the sample pay low dividends. This can imply that dividends are not prioritized as a profit distribution method or capital allocation among the companies in the sample. The mean of environmental expenditures, 16.97, is higher than the one on total dividends paid, 11.578. This could imply sample companies' interest or strategy focusing more on long-term sustainable investments than dividend distribution.

Regarding the statistics of control variables, a high standard deviation is present throughout the sample variable statistics. Leverage, ROA, and liquidity all have a wide range and, thus, high standard deviation, further emphasizing the diverging characteristics of the sample companies. However, considering the moderate standard deviation of 1.595 of firm size (market capitalization), the coherence of the sample companies' size can be confirmed. As the firm size does not explain the significant differences in the variables related to capital structure and performance, the wide scale of the other control variables could result from, e.g., different market environments, and company strategies of the sample.

While the SDG Index rating has a moderate standard deviation of 3.943, the range between the minimum of 66.4 and maximum of 86.8 confirms notable differences among countries, some being pioneers in achieving the SDGs while some are lagging. The divergence of the SDG Index ratings supports the possibility of obtaining results from the regression. However, the mean of 79.515 implies that the countries in the sample are, on average, above the global mean of approximately 65 (Sustainable Development Solutions Network, 2024). While most of the sample companies are from countries with moderate SDG Index ratings, there exists a considerable range, which can result in variation in firm behaviour on capital allocation decisions.

Table 5 presents the correlation matrix of the selected variables. The correlation between Tobin's Q and environmental expenditures is weak but positive. This observation supports the claim that investments in sustainability do not increase firm value within a short time period. As the sample runs only from 2016 to 2023 due to the novelty of environmental expenditure reporting, the long-term correlation between environmental expenditures and firm value remains to be defined and confirmed. As short-term impact on firm value is not found, the correlation aligns with previous literature and theoretical claims that the impact of sustainability on firm value occurs only after a longer period (United Nations Global Compact, 2004).

	TOBIN'S Q	ENV. EXPENDI -TURES	TOTAL DIVIDENDS PAID	LEVERAGE	SIZE	ROA	REVENUES	LIQUIDITY	SDG INDEX RATING	CPI	GDP
TOBIN'S Q	1										
ENV. EXPENDITURES	-0.0167	1									
TOTAL DIVIDENDS PAID	-0.0636*	0.00360	1								
LEVERAGE	0.0442	0.00577	-0.00332	1							
SIZE	-0.0138	0.0122	0.866***	-0.0193	1						
ROA	0.153***	-0.00896	-0.00250	-0.0371	-0.0123	1					
REVENUES	-0.147***	0.0515	0.839***	0.000856	0.798***	-0.0318	1				
LIQUIDITY	-0.0298	0.00149	0.000567	0.00992	0.000517	-0.0157	0.00717	1			
SDG INDEX RATING	0.0605*	0.0184	-0.0587*	-0.0703*	-0.0191	0.0843**	-0.0742**	0.0368	1		
CPI	-0.0666*	0.0321	0.0627*	0.0253	0.0576*	0.0619*	0.0902**	0.0584*	0.238***	1	
GDP	-0.0282	-0.00419	0.00241	0.0332	0.00847	0.0500	0.0229	-0.00909	0.0299	0.0992***	1

Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 Correlation matrix

The perceptions of investors and stakeholders of the sample companies could explain the weak negative correlation between Tobin's Q and total dividends paid, being -0.036, respectively. The negative correlation implies that dividend payment decreases firm value, although the impact is small. This is not surprising considering the median SDG Index rating of 79.8 of the sample. Countries' relatively high SDG Index rating score implies that countries, companies, and stakeholders consider sustainability matters more crucial than dividends. This can be seen as an incentive for companies to focus on investing in sustainability, with more opportunities for value growth compared to dividends.

The positive correlation between Tobin's Q to ROA and firm size (measured by market capitalization) is expected as firms with higher profitability are more valuable. Additionally, companies that have higher returns are preferred by investors, resulting in value growth. Larger firms tend to have higher sales volumes, have established their place in the industries, and have a customer base that supports the growth of the company.

The weakly negative correlations between Tobin's Q to GDP and CPI are also intelligible, as the slowing market situation reflects negatively on financial market development. However, the indirect impact of decreased GDP, such as decreased consumer spending resulting in sales volumes, is not captured by this variable. Accelerating inflation decreases the purchasing power of consumers, resulting in a loss in sales and thus, revenues. This impacts indirectly the company's financial stability and growth, reflected in a decrease in firm value.

Among the independent and control variables, only a few noteworthy observations must be made. First, the correlation between size and total dividends paid is significantly high, 0.866, at a 5% significance level. This implies that larger companies, measured by market capitalization, tend to pay more dividends. The correlation is not surprising but could cause multicollinearity problems in the regression. Secondly, the correlation between revenues and total dividends paid is highly positive, 0.839 at a 5% significance

level, respectively. Again, this relationship between variables is not surprising, as companies with higher revenues can distribute more profits in terms of, e.g., dividends. Thirdly, a high correlation can be observed between revenues and size, indicating that larger companies tend to have higher revenues. This can be explained by, for example, economies of scale, as larger companies tend to have higher production volume due to higher demand, which decreases average cost per unit while maintaining sales prices the same, resulting in higher revenues. Based on the correlation results, size is excluded from the control variables to avoid multicollinearity issues in the regression. By doing so, the aims of this study are served better, as the impact of dividends on firm value is one of the research objectives.

Uncertainty exists in reporting environmental expenditures due to a lack of reporting standards for such expenses. Additionally, the CPI of Russia has not been reported after 2021 due to the war in Ukraine—thus, the last two years are calculated averages of past CPI changes of Russia, which may create bias in the results. Finally, as the natural logarithm is taken from most of the variables, a moderating effect is implied.

7 Empirical analysis

Below are the results for all three regressions made. This chapter analyzes the results and discusses the observations in relation to the hypotheses of this study, in addition to comparing them to findings made in the previous literature on the same subject.

ln_TOBIN'S Q	Coef.	St.Err.	p-value	[95% Conf	Interval]	Sig
ln_ENV.EXP.	-.003	.011	.782	-.026	.019	
ln_DIV	.06	.026	.021	.009	.111	**
ln_LIQ	.014	.027	.601	-.038	.066	
ln_ROA	.249	.062	0	.127	.37	***
ln_REV	-.158	.016	0	-.19	-.126	***
ln_LIQ	-.022	.036	.543	-.092	.048	
SDG	.016	.005	.002	.006	.027	***
CPI	-.012	.002	0	-.016	-.007	***
ln_GDP	-.036	.028	.199	-.091	.019	
Constant	1.313	.634	.039	.069	2.558	**

Mean dependent var	0.014	SD dependent var	0.532
R-squared	0.386	Number of obs	570
F-test	34.013	Prob > F	0.000

*Significance: *** p<.01, ** p<.05, * p<.1*

Table 6 OLS regression with robust standard error results

Table 6 presents the results of the first regression conducted by OLS regression and accounting for robust standard errors. To start off by analyzing the suitability of the model, the R^2 is approximately 38.6%, indicating a moderate fit of the selected variables explaining the model. For this kind of a model this explanatory level is expected, as there often exists numerous firm-specific and market-specific independent variables that are impacting the independent variable with low coefficients which would require several control variables more, decreasing the simplicity of the model while not serving the study aims more properly. F-test 34.013 with p-value of 0.000 confirms the statistical

significance of the model. In other words, the model includes at least one independent variable that significantly impacts Tobin's Q (firm value).

Surprisingly, environmental expenditures with a p-value of 0.782 reveal that capital allocation to environmental matters does not impact firm value in terms of Tobin's Q. This would imply that companies' capital allocation to sustainability does not contribute to the sought-after firm value growth. Alternatively, the capital is not allocated to the right sustainability projects, which could suggest the need for redefining the ESG steps for the companies. The second independent variable, total dividends paid, has a positive coefficient of 0.06 with a p-value of 0.021, indicating that dividend payment increases firm value, although the impact is meager. This observation suggests that within the sample, yearly CFs are appreciated by investors, as dividend-paying companies are more valuable compared to companies not paying dividends. Additionally, this implies that focusing on dividend payout is better for firm value compared to long-term sustainability investments. Considering the relatively high SDG Index rating within the sample and the expected outcomes regarding the trade-off between sustainable investments and dividend payout when market sentiment regarding sustainability is high, the result is surprising and does not support the H_1 of this thesis.

Third variable of interest, SDG Index rating, has positive and statistically significant relationship to Tobin's Q. As well as total dividends paid, the coefficient of SDG Index is low, resulting in meager impact. However, the observations imply that SDG Index rating could work capturing the market sentiment on sustainability and thus, could be useful when developing the universal ESG-measuring framework. The coefficient 0.016 of SDG Index rating is nearly the same as found by Bose et al. (2022), which was 0.024. The statistical significance supports the usefulness of the variable, yet the SDG Index rating itself cannot replace ESG-ratings.

Development of sustainability engagement measuring is still needed. However, the observation indicates that in countries with higher SDG Index rating companies' have

higher firm value. Considering that SDG Index rating consists of both nationals and companies' actions towards SDGs, this connection is reasonable. Furthermore, it supports the stakeholder theory suggesting that when company's actions align with stakeholders' preferences, firm value is increased. If nation would not consider sustainability issues crucial, country's SDG Index would not be high.

Regarding the other control variables, what must be noted is the unexpected negative coefficient of revenue. In general, higher revenues would contribute to the financial health of company through increased capital gains. This observation implies that sample companies could either have inefficient cost-structure of goods and services provided or low profits margins, decreasing firm value when revenues grow. This might further impact to, for example, dividend distribution possibilities, regarding the possible explanations behind negative coefficient of revenues. Inefficient cost-structure or low profit margin decrease possibilities to distribute dividends, which can decrease with value due to the positive correlation between dividend payment and firm value.

With regards to the H_1 of this study, the results are ambiguous. The positive relationship between SDG Index rating and Tobin's Q partially support the H_1. However, based on the first regression it can only be stated that SDG Index rating has direct impact, and the impact to trade-off between long-term sustainability investments and dividend payout cannot be commented at this point. As the results revealed lack of significance of long-term sustainability investments (measured with environmental expenditures), the impact of SDG Index rating on the decision to allocate more capital into green expenses is expected to be found negative or insignificant in the following regression tests, which would imply acceptance of $Null_2$ and rejection of H_2.

Dividends positive impact on firm value offers insight to the market participants preferences, revealing that despite country's high engagement on sustainability, dividend payout is still appreciated by investors. This could imply that investing in long-term sustainability is seen inefficient, and the green transition of companies should be carried out in

other way than investments, supporting the view that there is no need for selecting either investments or dividends to increase firm value. Furthermore, this could imply that green investments are seen economically of ecologically inefficient, supporting the observations of risks of sustainability made in chapter 3.3. Lastly, it must be noted that OLS does not account for firm-specific fixed-effects that do not change over time but rather handles the data pooled, focusing on the direct impact of the dependent and control variables on firm value in general.

Secondly, regression following formula 7 was ran. Compared to the OLS regression of formula 6, the explanatory value (R^2) of formula 7 was less than half, indicating that when fixed effects are considered, the model does not explain firm values sufficiently. Due to the weakness of the model, interpreting the results in more detail was not seen significant. The regression results are only reported in Appendix 1.

ln_TOBIN'S Q	Coef.	St.Err.	p-value	[95% Conf	Interval]	Sig
ln_ENV.EXP.	-.662	.19	.001	-1.035	-.29	***
ln_DIV	-.588	.174	.001	-.93	-.246	***
ENV.EXP*SDG	.008	.002	.001	.003	.013	***
DIV*SDG	.008	.002	.001	.003	.012	***
ln_LEV	.058	.031	.059	-.002	.119	*
ln_ROA	.027	.03	.366	-.031	.085	
ln_REV	-.239	.043	0	-.323	-.155	***
ln_LIQ	-.018	.019	.348	-.056	.02	
SDG	-.235	.043	0	-.319	-.151	***
CPI	-.003	.002	.146	-.008	.001	
ln_GDP	.008	.016	.624	-.024	.04	
Constant	22.173	3.273	0	15.74	28.606	***

Mean dependent var	0.014	SD dependent var	0.532
R-squared	0.224	Number of obs	570
F-test	11.015	Prob > F	0.000

*Significance: *** p<.01, ** p<.05, * p<.1*

Table 7 Fixed-effects regression with interaction terms results

Lastly, table 7 above presents the results for fixed-effect regression model with interaction terms added (formula 8). While the two first models focused on explaining the direct relationships between the independent and control variables on firm value from two different viewpoints (pooled regression for overall impact and fixed-effect to address firm-specific characteristics, more suitable for panel data) and testing for the suitability of the selected main variables of interest to replace ESG-rating, the third regression aims to find answers for both H_1 and H_2 of this thesis. Adding the interaction terms improved the explanatory value R^2 indicating that the model is more suitable for explaining the firm value with selected variables. By adding the interaction terms the model can understand the sought-after relationships between the independent variables and SDG Index rating better, furthermore their combined impact on firm value, which is in the main interests of this thesis.

Following the OLS regression results, environmental expenditures remain having a negative direct impact on firm value, which is not surprising. As sustainability engagement has been characterized as being visible in the long-term, capital allocation within the sample period of 7 years is relatively short-term, and thus, engagement measured by environmental expenditures can result in short-term value loss. However, this does not take a stand on whether the long-term value-increasing impact truly exists – it only confirms that investing in sustainability in the short-term results in a loss in firm value. Investments, and especially sustainable investments, take time before they begin to yield profit, which further explains the direct relationship between environmental expenditures and firm value in this regression.

The positive coefficient of 0.008 and statistical significance a p-value of 0.001 reveals that an increase in the SDG Index rating of a country positively impacts the environmental expenditures of companies, which further positively impacts firm value. Despite the coefficient being low, with these results, we can reject $Null_2$ and, thus, accept H_2. Considering stakeholder theory, according to which stakeholders' preferences should influence company behaviour, this result is expected. When market sentiment considers

sustainability high, companies are motivated to allocate more capital to the matters to contribute and engage with sustainability themselves, in addition to avoiding reputational damages and enhancing relationships with stakeholders, resulting in increased firm value.

Dividends are found to have a negative impact on firm value, which aligns with the findings made by Bose et al. (2022). This implies that dividend payout is not always appreciated by investors, possibly due to more profitable options companies could allocate capital towards, e.g., reinvestments. This can be explained by the good growth prospects of sample companies, indicating that the sample consists more of growth than value companies.

Controversially, the interaction term (total dividends paid * SDG Index rating) received a positive coefficient of 0.008, being statistically significant at a 1% level. This implies that the influence of dividend payment on firm value is impacted by SDG Index rating, and dividend payment is more acceptable and valued in market environments where engagement on sustainability is higher. The impact is very low, as the coefficient is only 0.008, but the influence of SDG Index rating on dividend payment decisions does exist, resulting in a positive impact on firm value. This finding partially supports H_1 of this thesis – market sentiment does not impact on the trade-off between dividends and sustainable investments but helps companies to find right balance on allocating capital into them both.

While the SDG Index rating obtains a statistically insignificant value, the interaction terms reveal the influence of the SDG Index rating in other variables used in the regression as described above. However, the results reveal that the market sentiment does not impact the trade-off between long-term sustainability investments and dividend payout due to the coefficient being equal in both. The result indicates that when sustainability engagement (measured by SDG Index rating) increases, both sustainability investments and dividend payout are preferred options, resulting in an increase in firm value. If the interaction variables would have had unequal coefficients, the one with a higher

coefficient would be a preferable choice. Thus, based on the results presented in Table 7, $Null_1$ is accepted, and H_1 is rejected. The results are unexpected, as dividend payout can be unwanted by investors if there exist more profitable options to allocate capital. This was seen in the negative coefficient of dividends in the regression. On the other hand, the results could indicate that capital allocation in long-term sustainable investments is only profitable to a certain point, after which dividends can be considered as a valuable, secondary option to go alongside sustainable investments increasing firm value.

Some observations can also be made of the functionality of the different models, especially regarding the aims of this thesis. Formula 6 has the highest R^2 while finding the independent variables statistically insignificant. Although OLS regression is often used in previous literature aligning with the aims of this thesis, OLS does not serve the panel data characteristic of this sample as desired, ignoring firm-specific fixed effects, which are noteworthy in this context. Testing for H_1 requires a slightly more complex structure for the model to identify the relationship between independent variables and one control variable (SDG Index rating) and their effect on the dependent variable.

Although the R^2 was lower than expected throughout models, the results are better than expected in the sense that environmental expenditures, environmental R&D expenditures, and SDG Index rating have not been used, to the best of my knowledge, as key variables of interest in previous literature. Based on the observations, I can state that market sentiment does not have impact on the trade-off between sustainable investments and dividend payout, resulting in acceptance of $Null_1$ and rejection of H_1, but it cannot be stated with full confidence due to the low R^2 of the regression results. Additionally, the results revealed impact of market sentiment (measured by SDG Index rating) on allocating capital on both sustainable investments and dividends rather than choosing one of them, which partially supports the H_1.

8 Conclusions

Due to the value-creation effect that sustainability has been suggested to have, company valuation has been under a lot of research during the last decade. ESG ratings' bias and greenwashing risk discussed in chapter 3.3 has raised concern on whether seemingly highly sustainable companies truly allocate capital on the matters to make change. To find out whether sustainability measured by capital allocation and market sentiment truly increases firm value, the interaction of SDG Index rating, environmental expenditures, and firm value was examined in more detail. Dividends were included to account for alternative capital allocation decision, and to detect its role in environment with high sustainability engagement.

The observations made in this study about inconsistent capital allocation on sustainability or the lack of reporting support the ostensible engagement on sustainability through voluntary reporting and greenwashing, as green transition requires significant investments. While companies can report investments related to green transition on other investment and R&D expense items on their financial statements, it would not be consistent given the companies' apparent view of the importance of the ESG rating.

The expenses companies report for sustainable investments should reflect the companies' engagement in green transition and achieving SDGs and, thus, a higher ESG rating. This raises the question of why companies are not reporting their environmental expenditures more comprehensively and more in detail, referring to the scarce sample of only 160 companies from the whole of Europe obtained for this study. One possible explanation could be stricter and more monitored characteristics of financial statements compared to voluntary reporting. Thus, companies might focus on reporting the environmental expenses on their voluntary disclosures rather than in financial statements.

Based on the regressions, it can be concluded that market sentiment affects both long-term sustainability investments and dividend payouts, which further influence market-based firm valuation measured by Tobin's Q. However, the impacts are equal, meaning

that, for now, companies do not need to choose between these two options to enhance firm value. This results in the acceptance of $Null_1$ and the rejection of H_1. The results align with the observations made by Seth and Mahenthiran (2022), who found that sustainable engagement and dividends fulfil each other rather than exclude one another in value creation effectiveness.

As the results revealed, it is not clear whether the impact of the main variables of interest, environmental expenditures, total dividends paid, and SDG Index rating is positive or negative on their own. The OLS regression with higher R^2 suggests that environmental expenditures have negative impact on firm value whereas dividends and SDG Index rating would have positive. Given the fact that SDG Index rating remained statistically significant in both OLS and fixed-effects model with interaction terms, SDG Index rating could be used in the future when evaluating companies' value development. While the results on formulas 6 and 8 were statistically significant, it cannot be fully confirmed if SDG Index rating and its interaction with environmental expenditures and total dividends paid is better indicator than ESG ratings. However, based on SDG Index ratings' independence of business, I personally trust it more.

Adding the interaction terms in the model revealed the connection between market sentiment on sustainability to companies' capital allocation decisions. Based on the results, H_2 was accepted and thus, $Null_2$ was rejected – market sentiment does impact positively on companies' environmental expenditures, and unexpectedly, dividends as well.

The results of this study should be viewed and interpreted with caution. The reason for this is the restricted sample size and short time frame, especially regarding the long-term effect of sustainability, which cannot be captured properly in this study. However, as mentioned earlier, no study has been able to properly capture the long-term value-creation impact of sustainability engagement due to the novelty of the trend. Additionally,

this study is restricted to analyzing the impact of market-based value, and the results could diverge if the accounting-based value were analyzed.

The results of this study contribute to the existing literature by criticizing the usage of ESG ratings and suggesting an alternative approach to measure companies' sustainable engagement. As for the practical implications, the results suggest that in terms of firm value maximization, companies should combine capital allocation on both on sustainability investments and dividend payout regardless of the overall market sentiment on sustainability. By ignoring the possibilities by allocating capital on either one can be more inefficient for value creation. Rather than impacting on firm value through capital allocation decisions, market sentiment on sustainability engagement (measured by SDG Index rating) can directly impact firm value. Thus, it should be considered when making strategic decisions.

If I was an investor, based on the findings of this study, I would analyze companies' values and strategic actions related to sustainability and compare them with the SDG Index rating of the country where the company is operating. By doing so, I could recognize whether the company is making the decisions in alignment of their market sentiment or rather based on their own views regarding what is beneficial. If a company located in a country with high SDG Index rating would be making decisions that would not financially support their growth, I would think twice before investing due to the risk of green washing or inefficient capital allocation.

Additionally, I would follow the news regarding SDG Index ratings yearly in the near future and analyze how companies might react when new ratings are published. If there are changes in the ratings, I would try to look back the last year and understand the connection between the development of the Index and companies' market values locally. This would help understanding companies' interest towards sustainability trend more, considering the passing of the trend in the U.S. As ESG and SDGs are connected, I would follow their interaction to foresee any possible downfall signs of the ESG ratings to avoid

losses in my investments. Rating agencies presence in the scene and financial crisis of 2007 could happen again in the form of ESG passage, and thus, profit possibilities from short selling companies with high ESG rating could exist.

Although the results of this study were not able to offer a solution for the ESG rating "issue," they can be used when developing an ESG measurement framework. The results and limitations of this study suggest further research on comparing ESG ratings and SDG Index ratings role in firm valuation. The results of this study encourage researchers to try measure companies' sustainability engagement with other than ESG rating and testing the suitability of SDG Index ratings more. Additionally, future research could analyze the relationship between SDG Index rating and company capital allocation options impacting firm value by using other firm valuation indicator than Tobin's Q, such as HPR, or to analyze the relationship from an accounting-based view, using ROA.

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Appendices

Appendix 1. Regression results for formula 7

ln_TOBIN'S Q	Coef.	St.Err.	p-value	[95% Conf	Interval]	Sig
ln_ENV.EXP.	-.015	.015	.336	-.044	.015	
ln_DIV	-.003	.016	.827	-.035	.028	
ln_LEV	.083	.032	.009	.02	.145	***
ln_ROA	.02	.031	.507	-.04	.081	
ln_REV	-.288	.043	0	-.373	-.204	***
ln_LIQ	-.021	.02	.293	-.06	.018	
SDG	.004	.008	.642	-.012	.02	
CPI	-.002	.002	.465	-.007	.003	
ln_GDP	.003	.017	.874	-.03	.036	
Constant	4.268	.731	0	2.831	5.705	***

Mean dependent var	0.014	SD dependent var	0.532
R-squared	0.159	Number of obs	570
F-test	8.860	Prob > F	0.000

*Significance: *** p<.01, ** p<.05, * p<.1*

Table 8 Fixed-effects regression results