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**Geopolitical shock, ESG and stock returns: Evidence
from Nordic markets during the Russia-Ukraine
war**

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ABSTRACT:

This study examines the relationship between corporate responsibility and stock market returns by using an event study methodology in the Nordic markets around the start of the Russia-Ukraine war. Corporate responsibility is measured using environmental, social and governance (ESG) scores. Responsible investing dates to 1960s but in recent decades it has gained increasing popularity among both investors and academic researchers. Substantial amount of research has examined whether portfolios with higher ESG scores generate better returns than those with lower scores. More recently, attention has focused also to the relationship between ESG scores and stock returns during periods of crisis, such as the Covid-19 pandemic.

Prior literature provides mixed evidence on whether companies with higher ESG scores achieve better stock returns during crises or not. The Russia–Ukraine war provides a new context for examine this relationship. This study focuses on the Nordic markets, with a final sample of 338 publicly listed companies from Norway, Sweden, Finland, and Denmark. This study also provides a broad overview of prior research on responsible investing and stock returns during crisis periods.

In the empirical analysis, cumulative abnormal returns are examined across seven different event windows. Ordinary least squares (OLS) regressions are employed, the firm-specific characteristics, industry dummy and country dummy variables are controlled. All data used in the study are obtained from the London Stock Exchange Group (LSEG) database.

The results suggest a negative and statistically significant relationship between social pillar scores and stock returns. However, this relationship is observed only in the shortest event window following the outbreak of the war. In addition, results show a positive and statistically significant relationship between environmental pillar scores and stock returns in the longest post-event window. The total ESG score and governance (G) pillar do not provide statistically significant results in any of the event windows.

KEYWORDS: Event study, ESG, Nordic stock markets, Russia-Ukraine war, stock returns

VAASAN YLIOPISTO**Laskentatoimen ja rahoituksen yksikkö**

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TIIVISTELMÄ:

Tässä tutkielmassa tutkitaan tapahtumatutkimuksen avulla yritysten vastuullisuuden vaikutusta osaketuottoihin pohjoismaisilla markkinoilla Venäjän ja Ukrainan sodan alkuvaiheen ympärillä. Yritysten vastuullisuutta on mitattu yrityskohtaisilla ympäristö-, sosiaali- ja hallintopisteillä. Vastuullinen sijoittaminen juontaa juurensa aina 1960-luvulle asti, mutta viimeisen parin vuosikymmenen aikana se on nostanut suosiotaan niin sijoitusmarkkinoilla kuin akateemisessa tutkimuksessakin. Monissa tutkimuksissa on tutkittu tuottaako korkean ESG pisteiden portfoliot paremmin kuin matalammat, lisäksi ESG luokitusten yhteyttä osaketuottoihin on alettu tarkastelemaan eri kriiseissä, kuten esimerkiksi covid-19 kriisin aikana.

Aikaisemmat tutkimukset ovat antaneet ristiriitaisia tuloksia siitä tuottavatko korkeamman ESG luokituksen yritysten osakkeet paremmin kriisien aikana vai ei. Venäjän ja Ukrainan sota tarjosi uuden tilaisuuden tutkia ESG luokituksen yhteyttä osaketuottoihin kriisin aikana. Tämä tutkielma keskittyy pohjoismaisille markkinoille ja lopullinen otoskoko on 338 yhtiötä, joka sisältää Norjan, Ruotsin, Suomen sekä Tanskan pörssiyhtiöitä. Tutkielmassa käsitellään laajasti vastuullisen sijoittamisen aikaisempaa kirjallisuutta sekä kriisien vaikutusta osaketuottoihin.

Tutkimuksen empiirisessä osiossa osakkeiden kumulatiivisia epänormaaleja tuottoja tarkastellaan seitsemässä eri tapahtumaikkunassa. Tutkimuksessa on käytetty OLS-regressioita ja niitä on kontrolloitu useilla eri yrityskohtaisilla luvuilla, myös toimiala sekä maat on huomioitu kontrolleissa. Kaikki tutkimuksessa käytetty data on hankittu LSEG tietokannasta.

Tulosten perusteella sosiaalisen vastuu luokituksen ja osaketuottojen välillä on havaittavissa negatiivinen tilastollisesti merkitsevä yhteys sodan alkamisen jälkeen lyhyimmässä tapahtumaikkunassa. Lisäksi tulokset osoittavat positiivisen ja tilastollisesti merkitsevän yhteyden ympäristö luokituksen ja osaketuottojen välillä. Tämä tulos havaitaan vain sodan alkamisen jälkeen pisimmässä tapahtumaikkunassa. Kokonais ESG-pisteet ja hallintotapa luokitus eivät osoittaneet tilastollisesti merkitseviä tuloksia minkään tapahtumaikkunan aikana.

Avainsanat: Tapahtumatutkimus, ESG, Pohjoismaiset osakemarkkinat, Venäjän ja Ukrainan sota, osaketuotot

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Abbreviations

AR = Abnormal return
 CAR = Cumulative abnormal return
 ESG= Environmental, social and governance
 LSEG= London stock exchange group
 OLS = Ordinary least squares
 SRI = Socially responsible investing
 PRI = Principles of responsible investing
 US = The United States

1 Introduction

Responsible investing has become one of the key themes in financial markets during the last two decades. Investors are increasingly looking to include ethical and sustainability values in their portfolios. ESG investing has grown significantly in recent years, and in 2019 ESG focused portfolios in major markets exceeded 30 trillion US dollars (Broadstock et al., 2021; GSIA Report, 2023). As Edmans (2023) mentions, even the executives pay are tied to ESG metrics.

Among the countries leading this global change, Denmark, Finland, Norway, and Sweden have consistently been at the frontline of sustainability. According to Robeco's sustainability scores from 2022 to 2024, these four countries were the top performers among 150 nations evaluated for ESG criteria. The Nordic region's commitment to socially responsible investing (SRI) has deep historical roots (Bengtsson, 2008; Scholtens & Sievänen, 2013).

Responsible investing is based on religious and moral traditions (Renneboog et al., 2008), however modern ESG strategies have changed this, and nowadays responsible investing include different approaches such as positive screening and shareholder engagement (Scholtens & Sievänen, 2013). The term ESG was introduced in 2004 in United Nations Global Compact report "Who Cares Wins", and it outlined how businesses could incorporate environmental, social, and governance factors into their everyday business. (Krantz, 2024). Crises in the 2000s such as the global financial crisis (Lins et al., 2017) and the covid-19 (Albuquerque et al., 2020; Bae et al., 2021) have increased researchers' interest to examine the resilience of highly ESG oriented companies during crises. However, empirical evidence whether ESG ratings lead to better stock performance during crises remains mixed (Albuquerque et al., 2020; Bae et al., 2021; Broadstock et al., 2021; Kick and Rottmann 2024).

The Russia-Ukraine war in February 2022 was a new geopolitical shock to global markets, and it affected the global economy widely. From investors' perspective, the crisis caused uncertainty and the geopolitical risk increased to levels not seen in recent decades (Ahmed et al., 2023; Martins et al., 2023).

Some studies have examined stock performance during the Russia-Ukraine conflict. Bounboua and Yatié (2022) and Ahmed et al. (2023) analyzed global and European markets, and they found overall declines in stock returns. Kick and Rottmann (2024) and Kovacs et al. (2024) focused on ESG and individual pillars, finding that environmental and governance scores were associated with positive abnormal returns. Prior literature in this field has produced mixed results between corporate responsibility and firm performance. This study contributes to the existing literature by providing evidence from Nordic markets, which are ranked among the leading countries in sustainability. Specifically, the study focuses on the days surrounding the beginning of the Russia-Ukraine war and examines whether ESG scores, or the individual environmental, social and governance pillars, influence stock returns during this period.

1.1 Purpose of the study

This thesis examines the following research question: Does ESG performance provide resilience in Nordic stock markets around the beginning of the Russia-Ukraine war? In addition, the study seeks to examine whether the three ESG pillars, environmental, social, and governance, had different impacts on stock performance. As Edmans (2023) argues, studies often rely only on total ESG score, even though the individual ESG dimension may be more relevant based on the research purpose. Examining ESG pillars separately allows to identify whether investors value environmental, social and governance factors differently. The findings are intended to contribute to the growing body of literature on ESG investing by offering insights into the role of sustainability metrics in mitigating market risks under geopolitical uncertainty.

Despite the growing interest in ESG investing during geopolitical crises, such as financial crisis, covid-19 and Russia-Ukraine war, the Nordic countries have not yet been studied as a separate market. Nordic countries have leading position in sustainability, making them a unique case for analyzing ESG stock returns during geopolitical shock. Moreover, the high ESG standards in these countries may influence how or what investors think about risk and ESG during heightened uncertainty. In addition, as Nordic countries are geographically and economically closer to the Russia-Ukraine war, than many other countries, the Nordic markets are particularly relevant for examining the war impact on ESG and stock markets.

1.2 Research gap

Existing literature has examined ESG performance in the context of different crises such as financial crisis, covid-19 and Russia-Ukraine war, but there is limited research focusing, particularly in the Nordic region where ESG values are highly integrated into corporate practices. This research aims to fill this gap by providing empirical evidence on the relationship between ESG performance and stock performance in Nordic stock markets around the start of the Russia-Ukraine war. This study contributes to both the ESG investment literature and the broader field of event studies by extending the analysis from covid-19 pandemic (eg. Albuquerque et al., 2020; Bae et al., 2021) to the war context. Furthermore, study complements recent research focusing on the Russia-Ukraine war (e.g., Kick and Rottmann, 2024; Kovacs et al., 2024) by providing specialized focus on the Nordic markets.

As mentioned previously, prior literature has provided mixed results. Some studies suggest that higher ESG scores could improve companies stock performance during the crisis periods (Kovacs et al., 2024, Broadstock et al., 2021 & Lins et al., 2017), while others find no significant financial benefit from high ESG performance during crisis (Bae et al., 2021 & Demers et al., 2021). As the Russia-Ukraine war caused significant market disruption, this study examines whether firms with stronger ESG profiles in the Nordic region experienced different market reactions in the days surrounding the event date.

To position this study more specifically within the existing literature, it is important to highlight its key differences from closely related research. Kovacs et al. (2024) and Kick and Rottmann (2024) studies focus on the Russia-Ukraine war, and their sample consist of European companies. Their event windows ranges quite much around the event. In contrast, this study focuses on Nordic companies, and the event windows are clearly divided into pre-event, event date and post-event windows. This approach provides a clearer view of how the stock returns evolve around the event.

Furthermore, the studies differ in terms of model specification and variable selection. Kovacs et al. (2024) examine the impact of ESG as part of a broader framework that also incorporates geopolitical exposure, including governance related variables such as board structure as well as country-level measures of exposure to Russia, such as imports, exports and geographical distance to Russia. Similarly Kick and Rottmann (2024) used geographical distance as a control variable. In contrast, this study focuses on standard firm-level control variables used on previous similar crisis studies. While the direct exposure to Russia or geographical distance controls are not explicitly included, these factors are captured by using industry and country fixed effects, which mitigate the potential bias arising from varying levels of exposure across different sectors and countries.

1.3 Hypotheses

The hypotheses of this study are based on prior literature. The purpose of the research is to examine whether higher ESG scores are associated with better stock returns and greater resilience. The hypotheses align closely with the research question, hypotheses are presented below.

As mentioned previously the relationship between firms' ESG scores and stock prices has been widely examined in recent literature, however empirical results remain mixed. Several studies provide evidence that higher ESG scores may enhance firm resilience

during crises and lead to abnormal stock returns. For example, Lins et al. (2017) found that firms with stronger CSR engagement outperformed those with weaker CSR during the 2008–2009 global financial crisis. In addition, Albuquerque et al. (2020) analyzed US companies' environmental and social ratings in relation to stock returns during the covid-19. Their findings indicate that firms with high ES scores outperformed others in stock price performance. Kick and Rottmann (2024) found in their study that companies with higher ESG score achieve higher cumulative abnormal returns during the Russia-Ukraine war. These findings suggest that ESG score can affect companies stock performance. Based on this, the next hypothesis of this study is as follows:

H1: Firms with higher ESG scores experience better stock returns during the Russia-Ukraine war

Some previous studies have also examined the effects of individual ESG pillars. For example, Kovacs et al. (2024) focused on euro area stocks around the Russian invasion of Ukraine and found that firms with higher governance scores experienced stronger positive abnormal returns. Similarly Kick and Rottman (2024) found that environmental pillar provides protective effect around the war. In addition, Broadstock et al. (2021) focused on covid-19 period and found that strong performance in environmental (E) and governance (G) pillars positively influenced stock returns during the crisis. Based on these prior studies, the second hypothesis of this research is formulated as follows:

H2: Individual ESG pillars provide protection in the markets and lead to better stock returns during the Russia-Ukraine war

It is important to consider that the existing research results are mixed and there are also studies that have not found positive relationship between ESG and stock returns during crisis periods, such as (Bae et al., 2021 ; Demers et al., 2021). It is also noteworthy that companies operating with lower ESG scores might benefit from the war. For example energy related companies achieved abnormal returns after the war started because

these companies benefited from increasing oil and gas prices (Ahmed et al. 2023). In addition, Edmans (2023) mentions that before the Russia-Ukraine war started most investors classified defense companies as “non ESG”. However, after the war started many did a complete U-turn and rewrote their investment policies to classify defense as ESG.

1.4 Structure of the study

The structure of the study is as follows. First, the introduction presents the research purpose, the research gap, and the hypotheses. Next, the study provides an overview of responsible investing, including its history globally and specifically in the Nordic countries. Different responsible investing strategies are briefly described, followed by a more detailed explanation of ESG integration and the ESG scores. After that, theoretical background is presented, and it covers relevant frameworks such as the efficient market hypothesis, shareholder theory, stakeholder theory, institutional theory and event studies. Chapter 4 provides background on the Russia-Ukraine war focusing on its impact on global economies. The literature review follows chapter 4, summarizing previous studies on this topic. After the literature review, the data and methodology section describes how the data are obtained and the methods used for analysis. Finally, the study concludes with the results and discussion sections.

2 Responsible investing

This section provides an overview of responsible investing, tracing its origins and the factors behind its growing popularity. A review of responsible investing history helps to understand the ESG investing and its place in modern finance.

2.1 History of responsible investing

Socially responsible investing (SRI) differs from conventional investing by using specific screening criteria to include or exclude assets based on environmental, social, corporate governance, or ethical considerations. (Renneboog et al., 2008). Sparkes and Cowton (2004) mentions that the terms “ethical investing” and “socially responsible investing” are the most used in the field. They point out that ethical investing is the older one, but over time, it has been increasingly replaced by the term socially responsible investing (SRI).

According to Renneboog et al. (2008) ethical investing has deep historical roots, tracing back to the ancient origins in Jewish, Christian, and Islamic traditions. Judaism has a rich tradition of ethical guidance regarding the use of money, and in medieval Christian period, ethical limits were imposed on lending and investing practices, which were drawing from Old Testament principles. However, these early forms of ethical investing were based in religious values, modern socially responsible investing tends to reflect ethical and social beliefs of individual investors. (Renneboog et al., 2008).

Socially responsible investment funds were first launched in the United States in 1971. These funds were created for investors who opposed the Vietnam War and militarism in general, and its goal was to avoid investments in weapon contractors. (Renneboog et al., 2008; Sparkes & Cowton, 2004). In 1984, similar funds were introduced in the United Kingdom. These early SRI funds primarily followed an excluding strategy, aiming to avoid investments in companies which were unethical. These funds were built on the churches concern, particularly regarding industries such as alcohol, tobacco, gambling and

perhaps defense. Other issues were South African involvement during the apartheid era, the environment, human rights, pornography, and animal welfare issues. (Sparkes & Cowton, 2004). In addition, Scholtens and Sievänen (2013) mentions that early socially responsible investing (SRI) was mainly relied on negative screening, which means excluding certain industries or companies.

SRI was initially driven largely by retail investors, since the 1980s, institutional investors have taken the lead in responsible investment practices (Scholtens and Sievänen 2013). Since the early 1990s, the SRI industry has experienced significant expansion across the United States, Europe and globally. Key driver of this growth has been the rise of ethical consumerism. (Renneboog et al., 2008, p. 1725). By the turn of the millennium, the growth in SRI expanded, particularly among major institutional investors such as pension funds and insurance companies. Growth in SRI was driven by a combination of legislative compulsion and increasing pressure from both current and future stakeholders (Sparkes and Cowton 2004). Moreover, the financial crisis increased awareness among consumers and investors leading to a stronger emphasis on democratic principles and responsibility in the stock market. (Scholtens and Sievänen, 2013).

2.2 History of Nordics responsible investing

According to Bengtsson (2008) and Scholtens and Sievänen (2013) Sweden was an early pioneer in ethical investing, with its first socially responsible investment fund launched in 1965 by the temperance movement and the dissenting baptist movements. This fund was launched to exclude companies involved in alcohol, armament, firearms, and tobacco production. Furthermore, Scholtens and Sievänen (2013) mention that Norway and Denmark were relatively early adopters in SRI and launched ethical funds in the late 1980s and 1990s, while Finland began its SRI activities relatively late in 1999.

Religious values have significantly shaped the ethical investments in the European countries. However, in the late 1980s and early 1990s Scandinavian SRI noticed several developments. In 1988, the first environmental investment fund was launched, and it

used negative environmental screening. The following year, Norway established two environmental funds, and both was based on negative screening methods but incorporated a best-in-class approach as well. (Bengtsson, 2008).

SRI gained popularity throughout the 1990s, leading to the creation of more ethically oriented funds. Between the early and mid-2000s socially responsible investing evolved from being limited to niche or specialized funds and began to be widely adopted by large institutional investors throughout Scandinavia. (Bengtsson, 2008). According to Scholtens and Sievänen (2013), as of 2009 Norway had the largest SRI market among the Nordic countries, while Finland had the smallest. Norway differs clearly from its Nordic peers, leading the region in absolute and relative size, as well as per capita figures. It also holds the highest proportion of core SRI. In contrast, Finland lags in overall SRI development, although its core SRI segment is relatively well developed. Sweden had the dominance of broad SRI over core SRI, and between 2007 and 2009 Sweden was the only Nordic country where broad SRI experienced greater growth than core SRI. In the other countries, core SRI experienced growth, and it was the main contributor to the overall growth of SRI in the Nordic. (Scholtens and Sievänen, 2013).

2.3 Environmental, Social & Governance

This chapter discusses the development of Environmental, Social and Governance (ESG) and the Principles of Responsible investing. These are key concepts to explain in this research field.

2.3.1 Development of ESG and PRI

Responsible investing has developed throughout different centuries, its modern model began to take shape in the early 2000s. A particularly notable milestone was the 2004 United Nations Global Compact report “Who Cares Wins”, which introduced the term ESG (Environmental, Social and Governance) to describe environmental, social, and corporate governance factors in investment decision-making (Krantz, 2024). This created

the basis for ESG investing, where the principles of responsibility have been systematized into measurable and comparable criteria. In ESG analysis, the focus extends beyond traditional financial metrics to consider how environmental, social, and governance factors might influence a company's performance.

Nofsinger and Varma (2014) note that one of the main drivers of sustainability practices is the increasing investor interest in socially responsible investing (SRI), which includes approaches such as ethical and green investing. Previous research has shown that, early SRI funds typically avoided companies involved in producing goods or services considered socially harmful, including alcohol, tobacco, gambling, and weapons manufacturing (Nofsinger & Varma, 2014; Scholtens and Sievänen, 2013; Sparkes & Cowton, 2004). When the SRI segment developed, portfolio managers started to incorporate environmental, social, and governance (ESG) factors into their analysis, decision-making processes, and portfolio strategies (Nofsinger & Varma, 2014).

The United Nations Global Compact report (2004) mentions how businesses could incorporate environmental, social, and governance (ESG) factors into their operations. During the next decade, additional principles and frameworks were developed to guide companies to integrate and report ESG practices. One notable example is the Principles for Responsible Investment. (Krantz, 2024).

The PRI (Principles for Responsible Investment) was founded in 2006, and its main goal is to help investors to understand how environmental, social, and governance (ESG) factors affect investment decisions. It also supports a global network of investors to include these ESG factors in their investment practices. PRI is an independent organization that is not linked to any government or seeks to get profit. (PRI, n.d.)

The PRI is supported by a broad and growing group of signatories, which include institutional investors such as asset owners, investment managers, and service providers. These signatories have committed to implementing the six Principles for Responsible

Investment in their operations. Figure 1 below shows the growth in the number of PRI signatories and the total assets under management from 2006 to 2021.

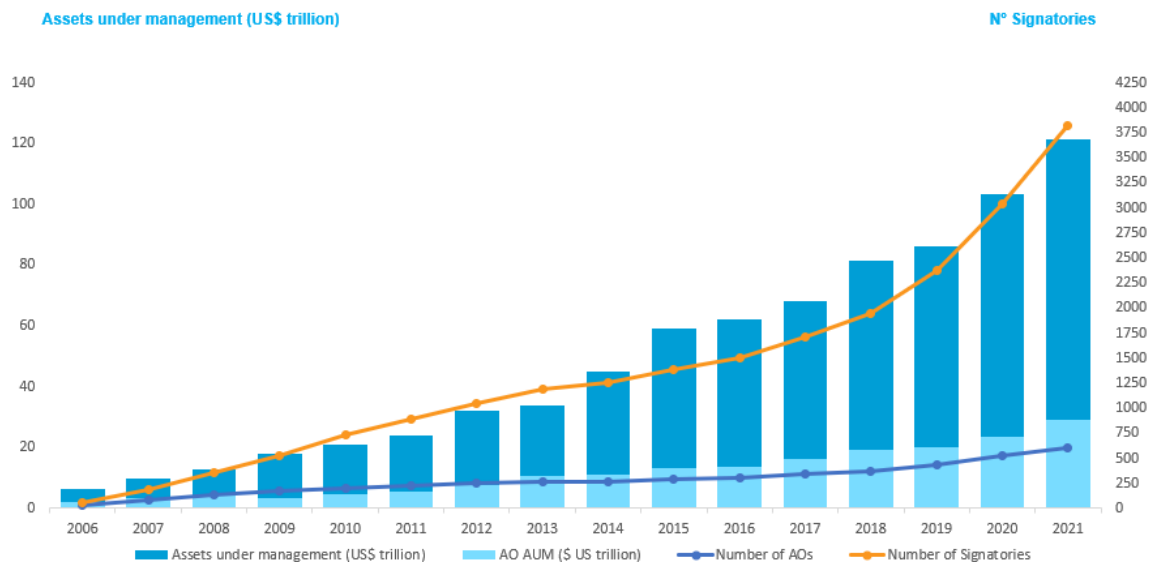


Figure 1. PRI Growth (PRI, n.d.).

As seen in Figure 1 above, increase in both indicators reflects the growing global commitment among investors to integrate environmental, social and governance factors into investment decision-making. According to PRI Annual report (2024) signatories has grown rapidly since 2021 and in 2024 there were over 5000 total signatories.

Research by McKinsey & Company (2020) found that most executives and investment professionals agree that ESG programs affect both short-term and long-term value creation. ESG has reached a turning point, by capturing the attention of executives, investors, regulators, business students, and the public. Strategic choices in the major companies are increasingly made through environmental, social, and governance implications. Moreover, executive compensations are now frequently linked to ESG performance indicators. (Edmans, 2023).

2.3.2 Environmental, Social and Governance ratings

Environmental, Social and Governance are three key factors used to evaluate how sustainable and responsible an organization or investment is. The environmental pillar focuses on how a company manages its impact on the planet, for example how companies reduce carbon emissions. The social pillar considers for example how company treats employees, communities, and suppliers. Governance pillar is linked to leadership, ethical behaviour, and decision-making processes in the organization. (Jonker & Krantz, n.d.).

In this study, ESG data is collected from the LSEG database, which provides ESG data on nearly 16,000 public and private companies. LSEG database divides ESG into three main pillars (E, S and G) with each pillar containing multiple categories. Environmental pillar (E) consists of three categories: Emissions, innovation and resource use. Social commitments (S) are measured in four categories: Community, human rights, product responsibility and workforce. Governance (G) is evaluated in three categories: CSR strategy, management and shareholders. In addition, each of these categories contains several themes. For example, emission category contains four themes: waste, emissions, biodiversity and environmental management systems. Workforce category includes four themes: diversity and inclusion, career development and training, working conditions and health and safety. CSR strategy category includes two themes: ESG reporting and transparency and CSR strategy. (Environmental, Social and Governance scores from LSEG, 2024).

LSEG ESG scores evaluate a company's performance on environmental, social, and governance factors by using publicly available data. The evaluation method is structured around three key pillars and 10 specific topics, as illustrated in Figure 2. To conduct this evaluation, LSEG collects and analyzes over 870 individual ESG metrics at the company level, primarily sourced from publicly disclosed information such as annual reports, sustainability reports, and official company websites. From this set of data, they select 186 of the most relevant and comparable data points to form the basis of the company's

overall ESG assessment and score. These selected metrics are chosen with consideration for materiality, data availability, and relevance to the industry. (Environmental, Social and Governance scores from LSEG, 2024).

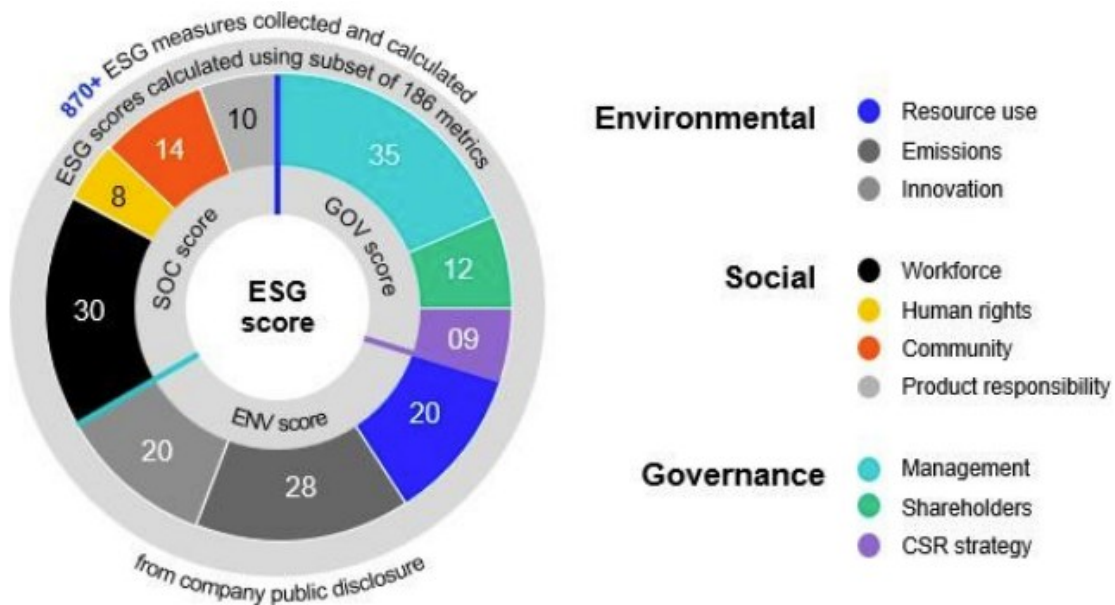


Figure 2. LSEG ESG Scores (Environmental, Social and Governance scores from LSEG, 2024).

In addition, the ESG pillar score is determined by combining weighted category scores. Weights for the environmental and social categories vary depending on the industry, however the weights for the governance category remain constant in all industries. (Environmental, Social and Governance scores from LSEG, 2024).

2.4 Different strategies

Sustainable investing involves many different strategies, and sometimes it is hard to find consensus for these. Investors can be responsible investors in several ways, depending on their goals and investment philosophy. The most common approaches include screening, thematic investing, impact investing and ESG integration. These strategies

have some differences, but all of them aim to incorporate sustainability considerations into the investment process.

Screening strategy includes norms-based screening, negative screening and positive/best in class screening. Norms-based screening evaluates investments to ensure they meet minimum business or issuer standards (GSIA Report, 2023). As highlighted in the European SRI study (2018) this strategy helps investors choose companies for their portfolios based on how well companies follow international standards and norms.

Negative screening is mostly excluding certain sectors, companies, countries, or issuers if these are considered unacceptable for investment. The exclusion criteria are often based on ethical standards and values and may relate to specific products such as weapons or tobacco, corporate behaviors like animal testing, human rights abuse, corruption, or involvement in controversies. (GSIA Report, 2023). This is the oldest known strategy of socially responsible investing, and it was used already in early 18th century. Originally, the focus was on industries posing risks to human health, like tanning and chemical manufacturing. Over time, the exclusion approach expanded to avoid so-called “sin stocks,” including companies involved in weapons, alcohol, tobacco, and pornography. (European SRI study, 2018).

Positive or best-in-class screening involves investing in sectors, companies, or projects that offer positive ESG performance compared to their industry peers. (GSIA Report, 2023). According to European SRI study (2018) the best-in-class strategy enables investors to select companies with the highest ESG scores within a specific industry sector.

Sustainability themed investing approach involves selecting assets that are directly linked to sustainability, whether within single-theme or multi-theme funds. Sustainability themed investments have primarily focused areas such as water management, renewable energy, and climate change. (European SRI study, 2018).

Impact investing refers to the intention of generating positive and measurable social and/or environmental outcomes along with financial returns. (GSIA Report, 2023). According to European SRI study (2018) three key requirements differ in impact investing from other investment strategies. First, intentionality, meaning the investor aims to achieve positive social and environmental impact. Second, additionality, ensuring that investment creates benefits that go beyond the provision of private capital. Third, measurement, which requires transparent assessment and reporting of the financial, social, and environmental performance of the investments. (European SRI study, 2018).

Engagement and voting approach emphasize active investor involvement in company operations. The European Union has worked to clarify investor responsibilities and encouraged investors to take sustainability as part of financial decision making. Engagement and voting approach is good way for investors to influence corporate behavior, for example to more sustainable business practices. (European SRI study, 2018).

The previously presented approaches are also important forms of responsible investing, however ESG integration is the most important one for the purposes of this study.

The continuous incorporation of environmental, social, and governance (ESG) factors into investment analysis and decision-making aims to improve risk-adjusted returns. (GSIA Report, 2023). As mentioned in European SRI study (2018) this approach has grown significantly, not only in Europe but worldwide, and has become the most used strategy among socially responsible investors. In addition, asset managers incorporate ESG factors into their investment decisions along with traditional financial analysis.

ESG integration was the most popular sustainable investing strategy in 2020, but it lost top position by 2022. However, it is worth noting that data from European markets was not available in the 2022 report. (GSIA Report, 2023).

3 Theoretical background

In this chapter four relevant theoretical perspectives to this study are introduced. First one is efficient market hypothesis (EMH) and it is based on idea that all available information is already reflected in stock prices. EMH is divided into three forms: weak, semi-strong, and strong. Second, the shareholder and stakeholder theory are introduced. Shareholder theory includes the traditional view of a firm's primary responsibility towards maximizing shareholder value, which is still one of the central considerations in financial market behavior. The stakeholder theory provides a broader perspective, highlighting the role of companies in addressing the interests of various stakeholders. Third one is institutional theory and it posits that corporate actions are often driven by institutional pressures. Finally, the theoretical foundations and historical development of the event study methodology are discussed.

3.1 Efficient market hypothesis

Efficient market hypothesis (EMH) is one of the main theories in financial research, and one of the best-known articles of this topic is by Eugene Fama (1970). Efficient market hypothesis is based on that financial markets reflect already all available information, meaning that investors cannot consistently achieve abnormal returns. In addition, Kendall (1953) published a classic and highly regarded study in which he analyzed, among other things, the behaviour of shares. In his study, he found that stock price movements do not follow a clear pattern (random walk), with prices just as likely to rise or fall, regardless of historical performance. Efficient market hypothesis is closely linked to the random walk theory. (Malkiel 2003, p. 59).

Efficient market hypothesis includes three different forms of efficient market: weak form, semi-strong form and strong form. Weak form asserts that stock prices are already incorporated with all past trading information, such as the past prices and trading volume. The weak form of the hypothesis suggests that analyzing past stock prices is essentially useless. Since this historical data is available to everyone, if it contained

consistent clues about future price movements, every investor would identify these opportunities and take advantage of these. (Bodie & Kane, 2014, p. 350-355; Fama, 1970).

Semi-strong form states that stock prices reflect all publicly available information, for example annual earnings announcements and stock splits. Since this information is available to everyone, it is reasonable to assume that the market has already adjusted prices to reflect it. Strong form in efficient market hypothesis states that stock prices reflect all information, including publicly available or information available only to company insiders. (Bodie & Kane, 2014, p. 350-355; Fama, 1970).

The strong form of the hypothesis represents the most extreme view. It acknowledges that corporate insiders often have access to valuable, non-public information before it is released to the public. This contains information that could be used for personal gain through trading. To avoid these kinds of situations, a significant part of the Securities and Exchange Commission's work focuses on preventing insiders from unfairly benefiting from this privileged situation. (Bodie & Kane, 2014, p. 350-355).

Although the Efficient Market Hypothesis (EMH) and the Random Walk Theory have provided foundational frameworks in finance, there are also academic studies which challenge this approach. For example, Lo and MacKinlay (1988) provided evidence that stock prices do not follow random walks especially in the short-term and for the smaller capitalization stocks. Malkiel (2003, p.61) mentions that markets can remain efficient even when they misprice assets, as seen during the internet bubble and even when many market participants behave irrationally. However, he does not claim that the market pricing is always accurate or that psychological factors have no impact on securities prices.

3.2 Shareholder and stakeholder theory

In his article Friedman (1970) notes that a business has a single primary social responsibility, to use its resources and participate in activities aimed at generating profit as long as it stays within the legal standards. This approach is known as the shareholder theory, which emphasizes that the main goal of a company is to maximize shareholder value. According to this perspective a company's financial success is seen as beneficial to society. The primary focus of the theory is on shareholders, and considerations such as ESG are not included.

Traditional finance textbooks emphasize that a company's main goal is to maximize shareholder equity, meaning that company's primary responsibility is financial. However, CSR started to gain increased attention from both policymakers and the public, who expected companies to take broader responsibility for their impact on society, environment, and various stakeholders. In addition, several studies suggest that corporate social responsibility initiatives may be undervalued by stock markets in the short term but in the long term such investments enhance shareholder value. In contrast, firms that fail to engage in socially responsible practices may destroy long term shareholder value due to reputational harm or increased exposure to legal risks. (Renneboog et al. 2008).

This increasing emphasis on CSR and broader corporate responsibilities is well captured in stakeholder theory. Freeman (1984) detailed the stakeholder theory in his book "strategic management: A stakeholder approach". According to stakeholder theory, companies affect many groups not just shareholders such as investors, customers, employees and suppliers. Therefore, it is essential to consider the interests of all these stakeholders when company is making business decisions. In addition, companies should focus on creating value for both shareholders and other stakeholders simultaneously. (Freeman, 1984). Jensen (2002) argues that traditional stakeholder theory is incomplete. He calls his own version enlightened value maximization and proposes what is the proper relation between value maximization and stakeholder theory should be. His version

includes many similarities to the stakeholder theory framework but argues that a firm's long-run goal is to maximize market value, and this cannot succeed without considering stakeholders. He criticizes traditional stakeholder theory because it does not include a clear criterion for decision-making.

Renneboog et al. (2008) argues that in competitive and complete markets there may be no conflict between shareholder and stakeholder value. However, in practice, maximizing shareholder value often conflicts with the stakeholder value criterion because of economic externalities.

3.3 Institutional theory

Meyer and Rowan (1977) introduced institutional theory, suggesting that companies are forced to follow society's rules and norms to gain sufficient legitimacy in the eyes of society. The theory argues that company's long-term survival depends not only on operational efficiency but also on its ability to keep up with changing social, political and governance expectations. (Meyer & Rowan, 1977).

Extending the idea of legitimacy and institutional pressures, DiMaggio and Powell (1983) introduced the concept of institutional isomorphism, and it is one of the key parts of institutional theory. It explains why companies start to resemble each other as a result of institutional pressures. They divided institutional isomorphism into three different types: coercive isomorphism, mimetic isomorphism and normative isomorphism. DiMaggio and Powell (1983).

Coercive isomorphism is based on the external pressures, for example laws, regulations and societal expectations, which companies follow to ensure the company's operations and legitimacy. Mimetic isomorphism results from environmental uncertainty. When companies do not have clear goals, they tend to imitate successful competitors. This is a resource efficient way to find solutions to complex problems, but it may lead companies to resemble others even without direct pressure. Normative isomorphism is based on

professionalization. For example, managers and experts in different organizations have a similar educational background and are part of the same professional networks, they tend to adopt similar values and ways of working. As a result, companies start to resemble each other. (DiMaggio and Powell 1983).

Sustainability reporting can also be seen as a result of institutional pressures. Instead of being purely a strategic choice, sustainability reporting may reflect coercive, mimetic and normative isomorphism. This institutional pressure is also evident in regulatory developments. The non-financial reporting directive was the first major regulation that required listed companies to make non-financial reporting in the European Union. The directive was established in 2014 and required listed companies to report, for example environmental, social and employee related matters from 2017 onwards. (Non-financial reporting directive 2014/95/EU). Corporate sustainability reporting directive is a new directive and adopted in 2022. Earlier non-financial reporting directive was replaced by this new directive, and it notably increased the requirements for sustainability reporting. (Corporate sustainability reporting directive 2022/2464).

3.4 Event studies

An event study is a research method used to assess the impact of a specific event on a firm's value. In the fields of accounting and finance, event studies have been widely applied to both firm-specific and broader economic events such as macroeconomic shocks (El Ghouli et al., 2023; Mackinlay, 1997). The methodology has a long history, with one of the earliest known studies conducted by James Dolley (1933), which analyzed the price effects of stock splits. Between the 1930s and 1960s, the event study approach continued to grow and evolve. A significant progress occurred in the late 1960s with two influential studies published by Ball and Brown (1968) and Fama et al. (1969). These works introduced a methodological framework for event studies that remains largely in use today. (Mackinlay, 1997, p. 13-14).

Event study is an important methodological framework in empirical research within finance and accounting. This approach focuses on analyzing how security prices behave in response to the new information or during specific events. Ball and Brown (1968) examined how security prices respond to the unexpected component of annual accounting earnings. Their study revealed that approximately 85 to 90 percent of the information conveyed in annual earnings reports was already incorporated into stock prices before the official announcement. Through their systematic approach, Ball and Brown significantly advanced understanding of the informational value of accounting data and its influence on market behavior. (Bowman, 1983).

Fama, Fisher, Jensen, and Roll explored a different type of event, stock splits. They investigated stock price behavior over a 60-month period surrounding the stock split to assess whether the market efficiently incorporated the information implied by such events. The findings suggested that prices adjusted promptly to the announcement of a split. Although the data used was relatively coarse for drawing definitive conclusions, the researchers found no evidence that the information could be used for abnormal trading gains. (Bowman, 1983).

As Fama (1970) states, an efficient market is one in which prices fully reflect all available information. This definition suggests that market prices must adjust instantaneously to significant events, which explains why event studies should include the announcement day and days around the announcement. In this context, significant abnormal returns indicate that markets are not fully efficient. However, a non-zero abnormal return observed during the pre-event period could reflect that investors anticipated the event, which does not necessarily imply inefficiency.

Similarly, a significant abnormal return on the announcement day is not inconsistent with market efficiency and may reflect the value created or lost because of the event. Furthermore, the significant abnormal returns following the announcement day may be

evidence against market efficiency, as the effects of the event should be incorporated into prices without delay. (El Ghouli et al., 2023)

4 The Russia-Ukraine conflict

4.1 Crisis development

Russia's invasion of Ukraine started in February 2022, and it is a terrible act against humanity, with serious consequences for people's lives. It has also significant economic impacts, especially in Europe and these effects have also been reflected in the stock markets.

Ongoing conflict between Russia and Ukraine dates to 2014 when tensions between these countries escalated due to the Crimea. It is traditionally regarded as Ukrainian region. Tensions between these two countries were mostly focused on the Crimean issue during the 2014-2021 period. Tensions started to increase when Russia started a military operation near the Ukraine borders in the late 2021. (Chowdhury & Khan 2023). According to Helin and Vähäkangas (2022) Putin signed a decree recognizing the separatist regions of Eastern Ukraine on February 21, 2022. Only few days later, on February 24, Russia started its attack on Ukraine.

This war started in fragile global economic environment, including increased inflation and ongoing issues in supply chains. The consequences of this conflict have become a central question for investors and forced businesses and investors to re-evaluate the importance of social responsibility priorities. (Clancey-Shang & Fu, 2024). The increased risk for investors is illustrated by the geopolitical risk index created by Caldara and Iacoviello (2022), which indicates that geopolitical tensions has reached to their highest point following the outbreak of the Russia-Ukraine conflict. (Ahmed et al. 2023 & Martins et al. 2023).

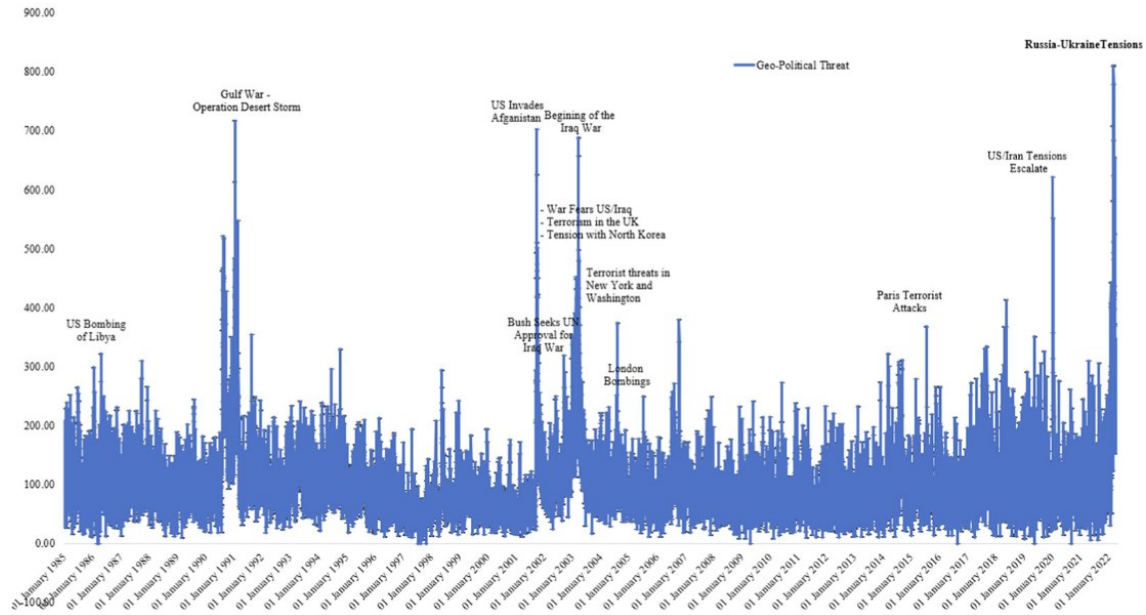


Figure 3. Geopolitical threats by Caldara and Iacoviello (2022).

Figure 3 above illustrates that the highest value in geopolitical threats was during the Russia-Ukraine war. The geopolitical risk index is constructed from published news articles relating to geopolitical tensions such as war, conflicts and terrorism.

4.2 Economic impact

Russia-Ukraine war created significant disruptions to global economic, especially to food, energy, and financial markets. Ukraine and Russia are both major food exporters and they supply huge amount of wheat, maize, barley, and sunflower oil. In addition, Russia is an important global supplier of natural gas, oil, and fertilizers. This conflict increased food, energy, and fertilizer prices to record high, and this affected especially developing countries that are heavily dependent on imports. Increasing commodity prices and financial stress worsened an already weak economic situation caused by covid-19. In general, the war increased economic uncertainty and showed dramatically how geopolitical events can quickly influence worldwide on global markets and financial performance. (United Nations, 2022).

Liadze et al. (2022) mentions in their article that the war cost is about 1% of global gross domestic product in 2022 compared to their forecast at the beginning of 2022. They also state that Europe will be most affected due to its energy and trade ties with Russia and Ukraine. For example, Finland's economy was recovering from the covid-19 crisis when Russia's invasion of Ukraine started. This war changed the economic development to a more pessimistic. Sanctions imposed on Russia have widely impacted inflation and reduced household purchasing power. These sanctions have also significantly limited Finland's trade with Russia and slowing economic growth. (Statistics Finland n.d).

Lo et al. (2022) examined how the Russia-Ukrainian war affected financial markets, focusing on countries' dependence on Russian commodities. Using data from 73 countries, the results show that the war significantly increased market volatility and lowered asset returns. Countries with a dependence on Russian commodities above 20% experienced stronger negative effects on stock returns. Volatility rose in all countries, but the effect intensified with higher dependence. (Lo et al. 2022). Clearly, this crisis has affected stock markets, and these effects will be discussed in more detail in the following chapter.

5 Literature review

Recent crises, such as the COVID-19 pandemic and the war in Ukraine, have prompted growing academic interest in the performance of ESG investments under economic uncertainty. At the same time socially responsible investing (SRI) has grown sharply as both individual and institutional investors increasingly emphasize sustainability and ethical practices in their investment decisions. However, during crisis periods such as covid-19 pandemic and the Russia-Ukraine war, investor behavior tends to favor traditional assets. This raises the question is the SRI only a luxury for stable market conditions. (Stefanelli & Storani, 2025).

More broadly, Giese et al. (2019), highlight that many researchers have examined the association between companies ESG profiles and their financial risk and performance. They also point out that several meta-analyses have summarized the results of over 1000 research reports. Despite the large body of literature, the overall evidence from this field remains mixed, without conclusion about the relationship between ESG factors and financial outcomes. (Giese et al. 2019). This literature review provides a comprehensive overview of how stocks have performed during different crises, such as covid-19 and wars.

5.1 Responsible investing and stock returns during crises

5.1.1 Negative or no effect

Stefanelli and Storani (2025) research covered the period 2014-2024 and examined how socially responsible funds perform relative to conventional market indices in different economic conditions. The results indicate that during times of market turbulence the performance of socially responsible funds and conventional indices tends to converge. Implying that the socially responsible investing appears to lose its significance in volatile market environments and gets overshadowed by major traditional indices like the S&P 500 and Nasdaq. At the same time, the spillovers affecting socially responsible funds

grow stronger, highlighting that these funds are not sheltered from market volatility, but in fact are significantly exposed to it.

Demers et al. (2021) examined if the ESG performance provided resilience during the covid-19 pandemic. Their study's findings suggest that overall ESG performance nor the environmental and social (ES) components did not provide resilience for share price declines during the pandemic. Firms with higher ESG scores did not experience higher returns in the first quarter of 2020 or during the entire year, after the controls were included. Walker et al. (2024) examined U.S. markets, specifically S&P 500, and their findings suggest that ESG factors did not significantly influence stock returns during the covid-19.

In addition, Bae et al. (2021) focused on the link between corporate social responsibility (CSR) and stock market returns during and after the covid-19 pandemic. They used same methodology as Lins et al. (2017), but they did not find evidence that CSR engagement had a positive relationship on stock returns during the covid-19.

While ESG and CSR did not appear to offer resilience during the covid-19, their performance under more favorable market conditions tells a different story. Bansal et al. (2022) examined abnormal returns from socially responsible investing and found that SRI stocks with high ratings tend to outperform those with low ratings during favorable economic conditions, such as periods of high market valuations or strong aggregate consumption. However, during economic downturns like recessions, highly rated SRI stocks tend to underperform. In addition, they also find that the decline in firm's social responsibility ratings leads to a temporary drop in abnormal returns, and this is especially highlighted during strong economic periods. Furthermore, abnormal returns following positive CSR-related news are significantly higher in good times compared to bad times.

Bansal et al. (2022) show that the benefits of high social responsibility ratings depend on economic conditions. In a similar way, Abedifar et al. (2023) examine how environmental and social ratings affected stock performance during the covid-19 crisis, comparing different countries (Canada, France, Japan, United Kingdom and the US) and time periods to see if high-ES firms were more resilient in a global downturn. Their sample consisted of 330 non-financial firms which were listed in five different countries. Their study shows that the effect of environmental and social ratings on stock performance during the covid-19 crisis varies across countries. In the United States, companies with high ES ratings experienced lower volatility during the market downturn, while similar effects were observed in Japan only after government support measures were introduced. However, in terms of returns, highly rated firms in Japan and the UK performed worse than their lower-rated peers during and after the downturn. For the other countries examined, significant relationship was not found between ES ratings and stock price behavior. Overall, the results suggest that higher ES ratings do not universally guarantee stronger performance in times of crisis.

5.1.2 Positive effect

Nofsinger and Varma (2014) focused on socially responsible funds in their study, and they were interested whether the crises affect these funds the same way as they affect in traditional funds. They identified two crisis periods, and the first one is after the technology bubble from March 2000 to October 2002 and the second one is around the global financial crisis from October 2007 to March 2009. The data consisted of 240 U.S. mutual funds during the period 2000-2011. Their results suggest that during non-crisis periods conventional funds outperform SRI funds by an annualized 0,67-0,95%. However, during crisis periods, SRI funds outperform conventional funds by 1,61-1,70%. A more detailed analysis shows that the outperformance during crisis periods is driven by mutual funds that focus on ESG issues. The study also concludes that funds employing positive screening strategy are generally associated with positive alphas during crisis periods.

In contrast to Nofsinger and Varma (2014), Lins et al. (2017) examined individual firms rather than fund level performance. They particularly examined the role of corporate social responsibility (CSR) during the global financial crisis. Their results show that, during the 2008–2009 financial crisis firms with strong CSR performance outperformed those with lower CSR scores by 4–7 percentage points in stock returns. These high-CSR firms were also more profitable, generated higher sales per employee, and were able to secure more debt during the crisis notably. This positive relationship between CSR and firm performance was evident only during crisis periods. (Lins et al. 2017).

While Lins et al. (2017) examined particularly CSR and stock returns, there is also studies focusing on individual ESG pillars and stock returns during crises. In this context, Broadstock et al. (2021) focused their study on the Chinese stock market, analyzing the effect of ESG performance during a covid-19 crisis period. They found that strong performance in environmental (E) and governance (G) pillars positively influenced stock returns during the crisis. However, improvements in the social (S) component of ESG had a negative effect on returns.

Expanding the scope beyond the Chinese market to U.S. markets Albuquerque et al. (2020) analyzed US companies environmental and social ratings in relation to stock returns during the first quarter of 2020. Their findings indicate that firms with high ES scores outperformed others in stock price performance, particularly during the market collapse. This outperformance was even stronger among high ES firms that also had a strong advertising presence. Moreover, these high ES firms experienced lower stock return volatility compared to other companies as also found by Abedifar et al. (2023).

Beloskar et al. (2023) focused on emerging markets, specifically India, and examined if the higher ESG scores provided protection during covid-19. They used event study methodology and found positive association between ESG scores and cumulative abnormal returns during the covid-19. The results also show that ESG reduced stock returns volatility during the covid-19 pandemic. Their final sample consisted of 335

companies, as Bloomberg provides ESG data for only this number of companies firms in the S&P BSE 500 index. ESG investing is still in its early stages in India and during 2019 and 2020 the first ESG funds were launched. (Beloskar et al., 2023). However, ESG is likely to have a significant impact on the long-term investing across emerging markets such as India in the future.

Ding et al. (2021) examined stock returns during the first five months of 2020 using a global sample of 6744 firms from 61 different countries. They found five key factors that provided better stock returns and one of them was stronger CSR activities. Results indicate that companies with higher level of CSR activities prior to the pandemic experienced higher stock returns during the covid-19. In addition, the relationship between CSR and resilience was found to be stronger among economies that prioritize environmental and social issues. They argue that these findings support the idea that CSR enhances loyalty and strengthens firms' relationship with stakeholders. Cardillo et al. (2023) found similar results in a European context by using dataset of 1204 firms from 15 European countries. They found that firms with higher ESG scores performed better than lower rated ESG firms in response to new information on national number of confirmed covid cases and deaths.

Fiorillo et al. (2024) examined the relationship between geopolitical risk (GPR) and stock price crash risk, with the focus on the mediating role of the ESG factors. They used international sample of publicly listed firms with ESG ratings during the 2010-2021 period. Their results suggest that higher GPR increases the probability of stock price crashes to occur more frequently and that the effect is mainly driven by the expectations and threats of geopolitical tensions rather than their actual realization or escalation. However, the results also indicate that higher ESG factors mitigate the negative relationship, especially among firms with higher environmental and social scores. (Fiorillo et al., 2024). As the results show that companies with higher environmental and social scores benefit companies by enhancing their resilience to exogenous shocks, companies should consider similar strategic approaches.

Alnafrh (2024) examined also the relationship between geopolitical risks (GPR) and the company's ESG performance relative to non-ESG companies. Results suggest that in the short run geopolitical risk affects both ESG and non-ESG companies performance. However, the impact on ESG companies is less severe. Furthermore, during the medium and long-term periods ESG companies appear to have ability to develop adaptive strategies that mitigate the impact of geopolitical risks.

5.2 ESG and stock returns during war

Hudson and Urquhart (2015) examined the effect of World War Two on the British stock market by using event study approach. They analyzed cumulative average abnormal returns (CAARs) following key positive and negative events during the War and complemented their analysis with regression techniques. Their findings revealed that significant negative events led to significant declines in stock returns on days following the event, whereas major positive events resulted in a statistically insignificant impact on returns on the next day. Overall, their results support the presence of a negative effect, suggesting that markets react more strongly to negative news than to positive news.

Historical conflicts like World War II have shown that stock markets tend to react more strongly to negative events, recent geopolitical crises continue to demonstrate similar patterns in market behavior. Bounboua and Yatié (2022) were among the first to investigate the effects of the Russia-Ukraine war on global stock market returns. Analyzing data from 94 countries, they found a significant negative relationship between the conflict and global stock performance. Their results also indicated that countries geographically closer to Ukraine or Russia experienced larger declines in market performance.

While Bounboua and Yatié (2022) research provided broad evidence of the Russia-Ukraine war impact on global markets, Boubaker et al. (2022) examined more closely the differences between developed and emerging markets. They used an event study

approach to evaluate the impact of the war on global equity markets. Their sample included 23 developed and 24 emerging markets classified by MSCI. The study revealed that the invasion led to negative cumulative abnormal returns (CARs) across global stock indices, though the effects varied by market. In addition, stock markets in NATO member countries exhibited higher returns compared to others.

Ahmed et al. (2023) used an event study methodology to examine the Russia-Ukraine war's effect on the European stock markets. They used a sample of 587 firms from the Stoxx Europe 600 index, and the event window ranged from 25 days before to 25 days after the event date. Study's findings show significantly negative average abnormal returns (AAR) across the window, with the sharpest decline occurring on the event day itself. The study presents robust evidence of the Russia-Ukraine crisis having a major effect on the European stock market.

In addition, Kamal et al. (2023) examined the impact of the Russia-Ukraine crisis on the Australian stock market by using an identical event study approach as Ahmed et al. (2023). The study results revealed significant abnormal returns on the event date, however this effect was short and mostly disappeared in the period following the event. Moreover, when they examined whether the negative stock price reactions differed based on firm size, they found that only small and medium-sized firms experienced significant negative effects on the event day. In addition, notable variation in average abnormal returns and cumulative abnormal returns were observed across different industries during the event window.

While Ahmed et al. (2023) and Kamal et al. (2023) focused on broader stock market reactions, Kick and Rottmann (2024) examined the association between ESG ratings and abnormal stock returns surrounding the Russia-Ukraine war. Their sample covers 30 European countries and findings indicate that firms with higher ESG scores and especially environmental scores experienced positive abnormal returns in the pre-event and post-event windows.

Expanding the analysis of ESG components, Kovacs et al. (2024) examined the individual performance of environmental, social, and governance scores during the Russia-Ukraine war. Their sample was eurozone companies and they found that companies with higher governance scores achieved better positive abnormal returns. These findings suggest that investors tend to emphasize corporate governance during uncertainty and geopolitical instability. However, the influence of governance pillar was less significant in countries with higher reliance on Russian oil imports. Based on results, environmental and social factors seemed to have relatively little attention from investors throughout the crisis.

Complementing Kovacs et al. (2024) focus on the impact of ESG components, Clancey-Shang and Fu (2024) examined how the U.S. stock market responded to the outbreak of the Russia-Ukraine war. Their particular emphasis is the role of corporate social responsibility. Specifically, they focused on the relationship between firms' environmental, social, and governance disclosures and their market quality dynamics at the start of the conflict.

Strong ESG disclosure enhances the market quality resilience of foreign firms listed in the US stock market. Specifically, firms with higher CSR performance had greater resiliency during market disruptions and liquidity declines during the Russia-Ukraine conflict. Their study's analysis shows that foreign companies experienced higher volatility and greater decline in liquidity than US firms. However, these negative effects were mitigated when foreign firms had higher ESG ratings. (Clancey-Shang & Fu, 2024).

Expanding the scope to fund-level performance, Cosma et al. (2024) examined the performance of socially responsible funds during the COVID-19 and the Russia-Ukraine war. The funds are categorized into three categories according to the European Union sustainable finance disclosure regulations, which are article 6, article 8 and article 9. The findings indicate that dark green (article 9) funds achieved superior risk-adjusted returns

compared to light green (article 8) and conventional funds (article 6). However, this outperformance was only statistically significant over the 1-month and 3-month periods. In 1-year period dark green funds did not significantly outperform others. The results also show that light green funds did not outperform conventional funds and generally underperformed relative to dark green funds across most periods.

6 Data & Methodology

This chapter presents the data and methodology employed in the empirical analysis. The empirical analysis consists of an event study framework with cross-sectional regressions. As mentioned in chapter 3.4 event studies have been widely applied to both firm-specific and broader economic events such as macroeconomic shocks (Mackinlay, 1997; El Ghouli et al. 2023). In this research event study is employed to measure cumulative abnormal returns surrounding the event and then the regression models are used to analyze the relationships between ESG scores and stock returns across different event windows surrounding the event. The first section of this chapter delves into data description and sample used in the study, while the second section outlines the variables used in the study and the third section describes the methodology.

6.1 Data description

In this study, the primary source of data is LSEG database. The LSEG database provides comprehensive ESG data, and these scores consider companies' performance in environmental, social, and governance pillars. Similarly, several recent studies have also used the LSEG database, formerly known as Thomson Reuters Refinitiv (Abedifar et al., 2023; Albuquerque et al., 2020; Bae et al., 2021; Demers et al., 2021; Kick & Rottmann, 2024; Kovacs et al., 2024). In addition to ESG scores database provides accounting and stock market data.

LSEG ESG scores are divided into four quartiles, and the scores vary between 0 to 100. A score in the first quartile ranges from 0 to 25, reflecting weak ESG performance relative to peers and a limited transparency into the public ESG information. The second quartile includes scores from 25 to 50, representing an acceptable level of ESG performance with a moderate degree of transparency in reporting ESG data. Companies scoring between 50 and 75 are in the third quartile, indicating strong ESG performance and above average transparency in publicly sharing material ESG information. Finally, the fourth quartile,

ranging from 75 to 100, reflects excellent ESG performance and a high level of transparency in disclosing material ESG data to the public (LSEG ESG Scores, n.d).

ESG and accounting data are for the year 2021 and stock prices data spans 2021 to 2022. This study follows the prior literature (Abedifar et al., 2023; Bae et al., 2021) by excluding financial firms from the final sample. Firms without 2021 ESG scores, accounting data, or stock prices for the required timeline were excluded. In addition, firms with duplicate listings were also removed.

Moreover, some studies rely on large indices (Ahmed et al., 2023; Walker et al., 2024), where companies typically have high market capitalizations and substantial trading volumes. In contrast, this study focuses on the Nordic markets, which include many micro-cap companies. Consistent with the previous research (Bae et al., 2021), micro-cap companies with market capitalizations below 250 million euros were excluded from the sample, as their low trading volumes can lead to unpredictable stock price movements. After these exclusions, only five Icelandic companies remained, with very minor trading volumes and price movements, therefore these companies were also excluded. The final sample consists of 338 firms: 49 from Denmark, 57 from Finland, 63 from Norway and 169 from Sweden.

6.2 Variables

Certain steps must be considered to ensure the accuracy of the research when the data are obtained from multiple countries. It is essential to convert all variables into one currency. (El Ghouli et al. 2023, p. 349). In this study, all the stock prices and accounting data are obtained from the database as a euro to enhance the accuracy of the study.

As mentioned before, accounting data for 2021 are obtained from LSEG database and are used to construct control variables: cash ratio, leverage, ROE, size, BM, and dividend yield. Cash ratio is determined by dividing cash and equivalents by the total book value of assets. Leverage is the book value of debt, where total debt includes the sum of short-

term debt, current portion of long-term debt and the book value of long-term debt, then this is divided by the book value of assets. Return on Equity (ROE) and dividend yield is obtained directly from the LSEG database. Size is defined as the natural logarithm of the book value of assets. Book to market ratio (BM) is calculated by dividing the book value of equity by the market value of equity. Variables used in this study are consistent with the existing literature especially on Albuquerque et al. (2020) and Kovacs et al. (2024). In contrast to Albuquerque et al. (2020), Tobin's Q is replaced by the Book-to-market ratio (BM), which is widely used in previous studies (e.g., Abedifar et al., 2023; Kovacs et al., 2024).

Following Kick and Rottmann (2024) to account for potential differences across industries and countries, industry-based and country-based dummy variables are used in the regressions as well. The inclusion of country dummies is important, as for example Bounbou & Yatié (2022) found in their study that countries geographically closer to Ukraine or Russia experienced larger declines in stock markets. Similarly, industry dummies are relevant, as energy related companies earned abnormal returns after the war started, as these companies benefited from rising oil and gas prices (Ahmed et al. 2023). The data used in the regressions includes also ESG score and E, S & G components separately, and these represent each firm's overall and pillar specific ESG performance.

Table 1 presents the descriptive statistics for the variables used in this study, based on 338 firm observations. The control variables have been winsorized at the 1% level in each tail, following Albuquerque et al. (2020). The data indicates that companies generally have moderate level of ESG performance, although there is considerable variation between the minimum and maximum values. The variation in ESG scores across companies is interesting, considering that according to Robeco's sustainability scores (Robeco, n.d. -a, n.d. -b & n.d. -c) Denmark, Finland, Norway, and Sweden have consistently ranked at the top of sustainability. Between 2022 to 2024, these four countries were the top performers among 150 nations evaluated for ESG criteria. However, as shown in Table 1 despite the strong national-level ESG performance of these

countries, it still does not automatically guarantee high ESG scores as the minimum ESG value 3,21 indicates. Notably, environmental pillar has the lowest mean and median values compared to the total ESG, social and governance scores.

Table 1. Descriptive statistics.

Statistic	Count	Mean	Median	Minimum	Maximum	St. Dev.	Kurtosis	Skewness
<i>ESG</i>	338	52,965	55,655	3,210	92,260	19,013	-0,586	-0,238
<i>E</i>	338	46,381	47,170	0,000	97,680	24,474	-0,981	-0,017
<i>S</i>	338	55,536	57,665	1,260	92,960	21,482	-0,592	-0,370
<i>G</i>	338	54,374	55,120	3,190	97,430	22,080	-0,867	-0,207
<i>Cash ratio</i>	338	0,149	0,091	0,004	0,946	0,163	5,765	2,309
<i>Leverage</i>	338	0,248	0,232	0,001	0,739	0,156	0,480	0,689
<i>ROE</i>	338	0,131	0,144	-0,825	0,695	0,215	5,596	-1,342
<i>Size</i>	338	13,872	13,809	10,545	17,610	1,546	-0,406	0,130
<i>BM</i>	338	0,412	0,284	0,021	2,122	0,400	5,520	2,174
<i>Dividend yield</i>	338	0,020	0,014	0,000	0,108	0,023	3,322	1,705
<i>CAR, -10,-1</i>	338	-0,023	-0,023	-0,485	0,312	0,099	2,811	-0,477
<i>CAR, -5,-1</i>	338	-0,015	-0,014	-0,381	0,190	0,067	4,581	-0,957
<i>CAR, -3,-1</i>	338	-0,001	-0,001	-0,366	0,135	0,046	12,360	-1,593
<i>AR 0</i>	338	-0,005	-0,007	-0,352	0,225	0,045	22,883	-2,076
<i>CAR +1,+3</i>	338	-0,006	-0,004	-0,438	0,230	0,070	9,203	-1,461
<i>CAR, +1,+5</i>	338	-0,009	-0,011	-0,658	0,326	0,086	11,300	-0,967
<i>CAR, +1,+10</i>	338	-0,009	-0,016	-0,700	0,543	0,106	9,402	0,392

Notes: The CAR's cover the pre-event windows, event date and post-event windows. ESG, E, S and G scores are obtained from LSEG database. Cash ratio is cash and equivalents divided by the book value of assets. Leverage is measured as the book value of debt. ROE and dividend yield is obtained directly from the LSEG database. Size is defined as the natural logarithm of the book value of assets. BM is calculated as the book value of equity divided by the market value of equity.

In addition, Table 1 shows that the financial position of the sample companies varies considerably. Although the mean leverage ratio indicates a moderate level of indebtedness. All CAR windows have negative median and mean value, suggesting that the event is on average perceived negatively by investors. Furthermore, negative values in all pre-event windows suggest that market may have reacted to developments before the war began. This negative effect might be due to the event on February 21, 2022,

when Putin announced the recognition of separatist regions in Eastern Ukraine. (Helin and Vähäkangas 2022). In addition, negative extreme values increase as the length of the post-event window expands.

Before entering more specifically into methodology part and results, table 2 below reports the correlation between variables. Based on results, total ESG score correlates strongly with individual E, S and G scores, which is expected because these are components of the total ESG score. It is notable that firm size correlates quite positively with the ESG scores, indicating that bigger companies tend to have higher ESG scores on average. ESG scores correlate positively in the pre-event windows, but the correlation turns negative in the post-event windows. Overall, the correlations between explanatory variables are mostly moderate and there are no significant indications of multicollinearity.

Table 2. Correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(1) ESG	1,000																
(2) E	0,841	1,000															
(3) S	0,896	0,723	1,000														
(4) G	0,753	0,437	0,483	1,000													
(5) Cash ratio	-0,185	-0,246	-0,172	-0,069	1,000												
(6) Leverage	0,023	0,066	0,027	0,008	-0,398	1,000											
(7) ROE	0,115	0,158	0,117	0,033	-0,282	-0,171	1,000										
(8) Size	0,645	0,642	0,568	0,427	-0,378	0,214	0,111	1,000									
(9) BM	0,044	0,112	0,053	-0,055	-0,209	0,190	-0,125	0,298	1,000								
(10) Dividend yield	0,218	0,293	0,206	0,078	-0,159	0,046	0,306	0,322	0,264	1,000							
(11) CAR, -10,-1	0,140	0,186	0,113	0,057	-0,096	0,039	0,128	0,229	0,244	0,268	1,000						
(12) CAR, -5,-1	0,118	0,156	0,112	0,043	-0,104	0,026	0,249	0,167	0,110	0,209	0,783	1,000					
(13) CAR, -3,-1	-0,019	-0,017	-0,033	-0,008	-0,014	0,003	0,170	0,043	0,060	0,072	0,559	0,722	1,000				
(14) AR 0	0,006	0,016	0,030	-0,064	0,042	-0,035	-0,014	0,055	0,005	-0,069	0,135	0,005	0,055	1,000			
(15) CAR +1,+3	-0,118	-0,109	-0,133	-0,064	0,084	-0,053	-0,044	-0,061	0,099	-0,088	0,247	0,181	0,338	0,341	1,000		
(16) CAR, +1,+5	-0,066	-0,005	-0,084	-0,079	0,008	-0,007	-0,031	0,036	0,260	0,001	0,249	0,176	0,281	0,388	0,849	1,000	
(17) CAR, +1,+10	-0,040	0,034	-0,047	-0,081	0,100	0,027	-0,140	0,028	0,206	-0,026	0,208	0,132	0,211	0,354	0,693	0,833	1,000

Notes: This table reports the correlations for dependent and independent variables. The CAR's cover the pre-event windows, event date and post-event windows. ESG, E, S and G scores are obtained from LSEG database. Cash ratio is cash and equivalents divided by

the book value of assets. Leverage is measured as the book value of debt. ROE and dividend yield is obtained directly from the LSEG database. Size is defined as the natural logarithm of the book value of assets. BM is calculated as the book value of equity divided by the market value of equity.

6.3 Methodology

This study employs an event study methodology, following prior literature (Ahmed et al. 2023; Kick and Rottmann 2024; Kovacs et al. 2024 and Walker et al. 2022) by applying the market model to estimate abnormal returns and cumulative abnormal returns, which are then analyzed using OLS regression. Defining the event date is an important part of the event study. This study's choice is consistent with previous literature (e.g. Boubaker et al., 2024; Kick and Rottmann 2024; Kovacs et al., 2024), the event date is 24.2.2022. By choosing the day as Russia-Ukraine war started (24 February 2022), it ensures this study's comparability with prior literature. However, some studies, such as Ahmed et al. (2023), use 21 February 2022 as the event date, which is the date when Putin announced the recognition of separatist regions in Eastern Ukraine.

To calculate abnormal returns, it is needed first to estimate normal returns. Normal returns are the returns that would be expected if the war had not started. For this purpose, a benchmark is required to compare the returns observed during the event. (El Ghoul et al. 2023). Following the methodology of Ahmed et al. (2023), who used Stoxx Europe 600 index to ensure a broad representation of diverse industries in their study as they focused on European markets, this study employs the MSCI Nordic Countries index. The index consists of 81 different companies which operates in Nordic countries: Sweden, Denmark, Finland and Norway. To ensure comparability, the index is quoted in euros and offers a well-diversified sector weighting. (MSCI Nordic Countries Index).

Figure 4 illustrates how the benchmark index responded surrounding the start of the war. The index had already started to decline before the event date (24.2.2022) but the drop continued during the event date. The lowest point of the index during the event window

occurred on 8.3.2022. The beginning and end of the event window are marked with vertical lines. Overall, the index decreased 7,4% during this relatively short event window.

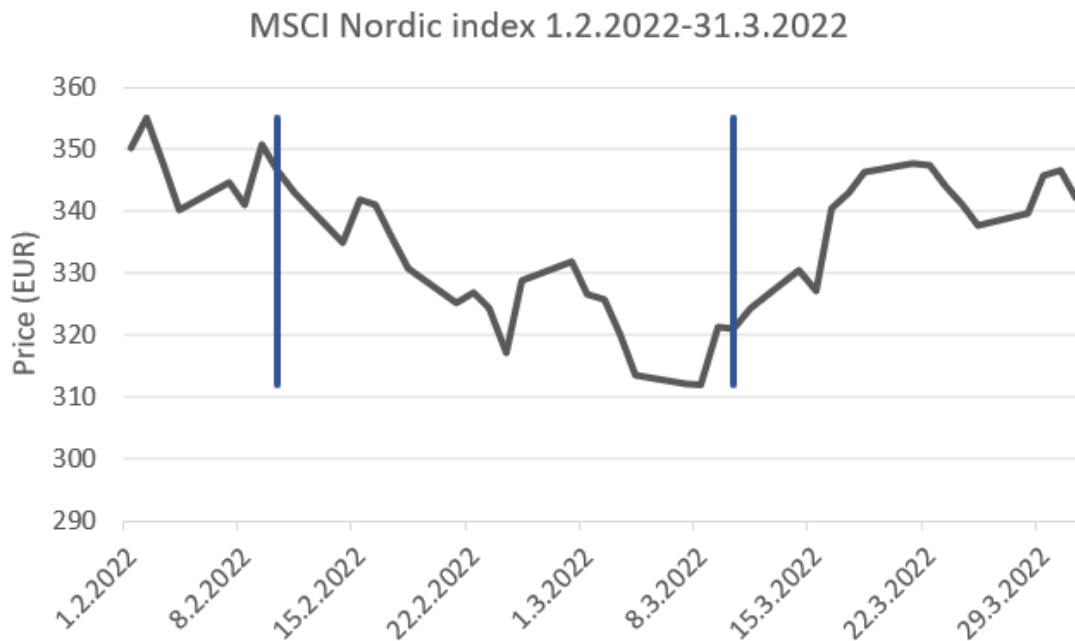


Figure 4. Performance of the MSCI Nordic index 1.2.2022-31.3.2022. SCI Nordic index 1.2.2022-31.3.2022.

Some of the models used to determine normal returns are for example market model, Fama and French's three-factor model and five-factor model. The market model is generally considered appropriate for event studies conducted over short periods. One reason is that when the event window is short, the measurement of abnormal returns is generally insensitive to the choice of model, as the risk level is unlikely to fluctuate significantly over a short period. (El Ghouli et al. 2023). According to MacKinlay (1997) additionally, the CAPM is one approach for estimating normal returns. While it was widely used in studies in the 1970s, some deviations from the CAPM have been found, raising questions about the validity of the constraints it imposes on the market model. These deviations suggest that research results may be sensitive to the specific restrictions of the CAPM. Since this potential sensitivity can be largely avoided at minimal cost by employing the market model, the use of the CAPM has almost disappeared.

This study employs the market model to estimate normal returns, following the approach of Kovacs et al. (2024) and Walker et al. (2024). The market model describes the relationship between the return of an individual stock return and the return of the market index, which in this study is the MSCI Nordic Countries index. Parameters α_i and β_i for each security are first estimated over an estimation window of 250 trading days, ending 40 trading days before the event. In this way, the market model estimates the security's expected normal return. Formula for market model (MacKinlay, 1997) is presented below.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \quad (1)$$

In equation above R_{it} is the returns at time t for security i and R_{mt} for the market portfolio, respectively. The term ϵ_{it} represents the zero mean disturbance term, while α_i and β_i are the parameters of the market model. Following previous studies (Ahmed et al., 2023; Albuquerque et al., 2020) returns are calculated as logarithmic returns.

The date on which the specific event occurs is named as time zero in event time. All other time periods are expressed relative to this reference point, indicating the number of periods before or after the event. (Bowman, 1983. p. 563). According to El Ghouli et al. (2023) researchers must ensure that the estimation window is not affected by extraordinary events, such as market crashes, which may distort the calculation of normal returns. They also mention that for event studies using daily stock returns an estimation period of at least 100 days is considered appropriate.

In this study the estimation period is 250 days, in line with prior literature (Ahmed et al., 2023; Kovacs et al., 2024; Walker et al., 2024). Estimation window dates from 14 January 2021 to 29 December 2021, ending 40 trading days before the event to ensure that the estimation of expected returns is not influenced by market reactions related to the

upcoming event. The event window ranges from the 10th trading day before the event date 24 February 2022 to the 10th trading day following the event (-10, +10).

The Abnormal returns (AR) for the event window are calculated by comparing the actual returns of the stock to the expected normal returns estimated by the market model, by using estimated parameters from the equation below:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{Mt}) \quad (2)$$

In the formula above, AR_{it} represents the daily abnormal return for firm i on day t , whereas R_{it} is the stock's actual return, α_i and β_i are the estimated parameters from the market model, and R_{Mt} is the return for the market portfolio. After estimating the abnormal returns, the cumulative abnormal returns are calculated by summing the daily abnormal returns for event i over the period (t1, t2). In this research cumulative abnormal returns are calculated for three pre-event windows, event date and for the three post-event windows. The equation for cumulative abnormal returns is presented below.

$$CAR_i = \sum_{t=\tau_1}^{\tau_2} AR_{i,t} \quad (3)$$

The next step in this study is to employ cross-sectional regressions to examine ESG resilience. While the previously mentioned methodologies identify abnormal returns and cumulative abnormal returns, these results do not explain which specific firm characteristics may have driven them. To determine whether a firm's ESG score enhances its resilience surrounding the event, the previously calculated cumulative abnormal returns are regressed and the ESG score and set of firm-specific control variables are included in the regression. The regression is stated below in equation 4:

$$CAR_i = \beta_0 + \beta_1 ESG\ Score_i + \beta_2 Firm\ Controls_i + IndustryDummies + CountryDummies + \epsilon_i \quad (4)$$

In the equation above, the dependent variable CAR_i represents the cumulative abnormal returns for firm i during period t . The independent variable $\beta_1 ESG Score_i$ is ESG score for each firm, $\beta_2 Firm Controls_i$ includes the control variables described in chapter 6.2, the equation also includes industry and country dummies. This regression is conducted to each CAR period. Cross sectional regressions are also estimated for each window without control variables, as shown in equation 5 below. In addition, in both equations each ESG pillar is examined separately by replacing ESG score with individual ESG pillars (E, S, and G).

$$CAR_i = \beta_0 + \beta_1 ESG Score_i + IndustryDummies + CountryDummies + \epsilon_i \quad (5)$$

7 Results

This chapter presents the empirical results of the cross-sectional regressions. The models were tested for the six different windows around the event and for the event date 24.2.2022. Data and the methodology for empirical testing are presented more specifically in chapter 6. The regression results are reported in tables including results with and without control variables, industry and country dummies are included in all models. In the first section of this chapter total ESG score regressions are reported and then environmental, social and governance score regressions separately.

7.1 Total ESG score

Table 3 below shows the results for the regression using total ESG rating as the key independent variable. ESG score is positive and statistically significant in the pre-event windows (-10, -1 and -5, -1) without the control variables. However, after the control variables are included, this significance disappears, suggesting that the positive association before the event date is explained by other factors. The control variable return on equity (ROE) is positive and statistically significant at the 1% level in the (-5, -1) and (-3, -1) windows, suggesting that investors may have preferred more profitable companies just before the war began. The rest of the control variables do not show statistically significant results.

During the event date ESG scores are not statistically significant with or without control variables, and neither are the control variables. However, in the post-event window (+1, +3) ESG score turns statistically significant and negative, but this significance disappears after control variables are included. In the (+1, +5) post-event window negative relationship persists but turns statistically insignificant even without the control variables. In the longest (+1, +10) window ESG score turns back to positive after the control variables are included. There are also statistically significant results among the control variables. Book-to-market (BM) is positive and statistically significant at the 1%

level in the (+1, +5) window, however it becomes non-significant in the longest post-event window.

Table 3. Total ESG score and stock returns.

Dependent variable	CAR (-10.-1)	CAR (-10.-1)	CAR (-5.-1)	CAR (-5.-1)	CAR (-3.-1)	CAR (-3.-1)	AR 0	AR 0	CAR (+1.+3)	CAR (+1.+3)	CAR (+1.+5)	CAR (+1.+5)	CAR (+1.+10)	CAR (+1.+10)
ESG	0.077*** (0.025)	0.053 (0.034)	0.045** (0.018)	0.033 (0.024)	0.003 (0.013)	-0.009 (0.017)	0.011 (0.013)	-0.001 (0.018)	-0.031* (0.019)	-0.027 (0.025)	-0.018 (0.023)	-0.011 (0.031)	-0.003 (0.029)	0.026 (0.039)
Cash ratio		0.003 (0.038)		-0.001 (0.027)		0.013 (0.019)		-0.012 (0.019)		-0.003 (0.028)		-0.034 (0.034)		0.030 (0.044)
Leverage		-0.033 (0.036)		-0.007 (0.025)		-0.003 (0.018)		-0.016 (0.018)		-0.032 (0.027)		-0.031 (0.032)		0.014 (0.041)
ROE		0.033 (0.026)		0.072*** (0.018)		0.045*** (0.013)		0.005 (0.013)		0.006 (0.019)		0.010 (0.023)		-0.030 (0.030)
Size		0.002 (0.005)		0.000 (0.003)		0.002 (0.002)		0.003 (0.002)		0.000 (0.004)		-0.002 (0.004)		-0.004 (0.005)
BM		0.019 (0.014)		0.000 (0.010)		0.002 (0.007)		-0.008 (0.007)		0.012 (0.010)		0.036*** (0.013)		0.026 (0.016)
Dividend yield		0.387 (0.236)		0.067 (0.167)		-0.078 (0.120)		-0.100 (0.122)		-0.270 (0.176)		-0.184 (0.214)		-0.131 (0.272)
Constant	-0.084*** (0.016)	-0.108* (0.057)	-0.044*** (0.012)	-0.051 (0.040)	-0.009 (0.008)	-0.036 (0.029)	-0.013 (0.008)	-0.032 (0.029)	-0.010 (0.012)	-0.004 (0.043)	-0.028* (0.015)	0.001 (0.052)	-0.015 (0.018)	0.013 (0.066)
Observations	338	338	338	338	338	338	338	338	338	338	338	338	338	338
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0,260	0,272	0,162	0,203	0,100	0,122	0,066	0,060	0,192	0,189	0,203	0,214	0,160	0,161

Notes: This table reports the results of cross-sectional regression for six CAR windows and for the event date 24.2.2022. ESG is the key independent variable, and all other variables are control variables. All regressions contain industry dummies and country dummies, and for each window, results without control variables are also reported. Control variables are winsorized at the 1% level in each tail. Standard errors are reported in parentheses. Statistical significance is indicated as 1% (***), 5% (**), and 10% (*).

Adjusted R² have quite high values in pre-event and post-event windows but in the event date adjusted R² decreases significantly. In addition, it increases almost in every window after the control variables are included into regressions. Adjusted R² is higher in the pre-event and post-event windows, suggesting that companies' characteristics such as ESG and financial metrics begin to explain stock returns better when event window is longer. To conclude table 3, immediately after the war started, companies with higher ESG

scores performed weaker than lower ESG score companies, but this result does not remain robust after control variables are included.

7.2 Environmental pillar score

Table 4 below shows the results for the regression using the individual environmental pillar rating as the main independent variable. In the pre-event windows environmental score shows positive and statistically significant results at the 1% level in the (-10, -1) and (-5, -1) windows. However, after including control variables, statistical significance disappears. Control variable return on equity (ROE) is positive and statistically significant at the 1% level in the pre-event windows (-5, -1) and (-3, -1).

During the event date, environmental scores do not show statistically significant results, either with or without control variables. In addition, control variables do not show significant results either.

In the (-3, -1) and (+1, +3) window environmental score results become negative, but not statistically significant. In the longer post-event windows (+1, +5 and +1, +10) environmental score turns back to positive and gets statistically significant results at the 5% level in the longest (+1, +10) window. Similarly, Kick and Rottmann (2024) found that particularly companies with higher environmental scores experienced less negative abnormal returns in post-event windows. As table 4 shows, control variable book-to-market (BM) is statistically significant at the 1% level in (+1, +5) window and at the 10% level in (+1, +10) window.

Adjusted R^2 values ranges between near zero to 0.271. Including control variables into regressions increases adjusted R^2 values almost in every window. Overall adjusted R^2 declines before the war started and at the event date, which indicate that firm-level fundamentals were not that relevant during the high market uncertainty. However, after the war had begun, adjusted R^2 started to increase again, reaching its post-event highest value in the (+1, +5) window.

Table 4. Environmental score and stock returns.

Dependent variable	CAR (-10,-1)	CAR (-10,-1)	CAR (-5,-1)	CAR (-5,-1)	CAR (-3,-1)	CAR (-3,-1)	AR 0	AR 0	CAR (+1,+3)	CAR (+1,+3)	CAR (+1,+5)	CAR (+1,+5)	CAR (+1,+10)	CAR (+1,+10)
E Score	0.060*** (0.020)	0.036 (0.026)	0.038*** (0.014)	0.026 (0.018)	0.002 (0.010)	-0.009 (0.013)	0.010 (0.010)	0.003 (0.013)	-0.019 (0.015)	-0.008 (0.019)	0.003 (0.018)	0.020 (0.023)	0.024 (0.023)	0.065** (0.030)
Cash ratio		0.004 (0.038)		0.000 (0.027)		0.013 (0.019)		-0.012 (0.019)		-0.004 (0.028)		-0.034 (0.034)		0.032 (0.043)
Leverage		-0.036 (0.036)		-0.009 (0.025)		-0.002 (0.018)		-0.016 (0.018)		-0.030 (0.027)		-0.029 (0.032)		0.015 (0.041)
ROE		0.032 (0.026)		0.071*** (0.018)		0.045*** (0.013)		0.005 (0.013)		0.006 (0.019)		0.009 (0.023)		-0.033 (0.030)
Size		0.003 (0.004)		0.001 (0.003)		0.002 (0.002)		0.002 (0.002)		-0.002 (0.003)		-0.005 (0.004)		-0.008 (0.005)
BM		0.018 (0.014)		0.000 (0.010)		0.002 (0.007)		-0.007 (0.007)		0.012 (0.010)		0.037*** (0.013)		0.028* (0.016)
Dividend yield		0.373 (0.236)		0.056 (0.167)		-0.074 (0.121)		-0.103 (0.122)		-0.271 (0.177)		-0.202 (0.214)		-0.175 (0.271)
Constant	-0.071*** (0.013)	-0.111* (0.057)	-0.038*** (0.009)	-0.050 (0.041)	-0.008 (0.007)	-0.039 (0.029)	-0.012* (0.007)	-0.028 (0.030)	-0.017* (0.010)	0.007 (0.043)	-0.037*** (0.012)	0.028 (0.052)	-0.026* (0.015)	0.058 (0.066)
Observations	338	338	338	338	338	338	338	338	338	338	338	338	338	338
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0,259	0,271	0,164	0,203	0,100	0,123	0,067	0,061	0,189	0,186	0,202	0,216	0,163	0,173

Notes: This table reports the results of cross-sectional regression for six CAR windows and for the event date 24.2.2022. Environmental pillar score (E Score) is the key independent variable, and all other variables are control variables. All regressions contain industry dummies and country dummies, and for each window, results without control variables are also reported. Control variables are winsorized at the 1% level in each tail. Standard errors are reported in parentheses. Statistical significance is indicated as 1% (***), 5% (**), and 10% (*).

Overall, table 4 results show that the environmental score had a mixed role during the event window. Before the war started, companies with higher environmental scores achieved better stock returns, but this effect disappeared after the control variables were included. After the war started, environmental scores did not play a significant role in stock returns and the positive relationship returned in the (+1, +5) window. It is notable that positive relationship turns statistically significant in the longest (+1, +10) window but at the same time adjusted R² decreases. In addition, companies with higher BM started to perform better in (+1, +5) and (+1, +10) windows.

7.3 Social pillar score

Table 5 below reports the results of the regression analysis utilizing the individual social pillar score as the main independent variable. In the pre-event windows social pillar scores are positive and statistically significantly correlated with cumulative abnormal returns over the longer windows (-10, -1) and (-5, -1), however this statistical significance disappears after the control variables are included. This indicates that social scores do not have explanatory power for cumulative abnormal returns before the war. Several control variables have statistically significant results during pre-event windows. Return on equity (ROE) is positively correlated with cumulative abnormal returns and is statistically significant at the 1% level in (-5, -1) and (-3, -1) windows. In addition, dividend yield is positive and statistically significant in the pre-event (-10, -1) window.

On the event date, neither the social pillar score nor any of the control variables exhibit statistically significant results. This indicates that firm-specific fundamentals may not provide significant protection for price fluctuation during the event day.

The role of the social pillar score changes markedly in the post-event windows. Following the event date, social pillar score becomes negative and statistically significant at the 5% level in the (+1, +3) window and the negative significance remains after the control variables are included but the significance level decreases to 10%. This suggests that companies with higher social scores tend to experience lower cumulative abnormal returns during the shortest post-event window. The statistical significance vanishes in the (+1, +5) window and in the (+1, +10) window social pillar score shifts to positive.

Broadstock et al. (2021) also found in their study that the social (S) component had a negative effect on stock returns during the covid-19 crisis. Moreover, their findings are in line with table 4, as they found that strong performance in environmental (E) pillar positively influenced stock returns. In addition, as table 5 shows book-to-market (BM) is positive and statistically significant at the 1% level in the (+1, +5) post-event window.

Table 5. Social pillar score and stock returns.

Dependent variable	CAR (-10,-1)	CAR (-10,-1)	CAR (-5,-1)	CAR (-5,-1)	CAR (-3,-1)	CAR (-3,-1)	AR 0	AR 0	CAR (+1,+3)	CAR (+1,+3)	CAR (+1,+5)	CAR (+1,+5)	CAR (+1,+10)	CAR (+1,+10)
S Score	0.041* (0.022)	0.005 (0.027)	0.030* (0.016)	0.012 (0.019)	-0.005 (0.011)	-0.017 (0.014)	0.014 (0.011)	0.008 (0.014)	-0.036** (0.016)	-0.036* (0.020)	-0.026 (0.020)	-0.028 (0.025)	-0.008 (0.025)	0.007 (0.032)
Cash ratio		0.004 (0.038)		-0.000 (0.027)		0.013 (0.019)		-0.012 (0.019)		-0.004 (0.028)		-0.034 (0.034)		0.031 (0.044)
Leverage		-0.038 (0.036)		-0.009 (0.025)		-0.004 (0.018)		-0.015 (0.018)		-0.034 (0.027)		-0.033 (0.032)		0.013 (0.041)
ROE		0.033 (0.026)		0.072*** (0.018)		0.045*** (0.013)		0.005 (0.013)		0.006 (0.019)		0.010 (0.023)		-0.030 (0.030)
Size		0.006 (0.004)		0.002 (0.003)		0.003 (0.002)		0.002 (0.002)		0.001 (0.003)		-0.001 (0.004)		-0.002 (0.005)
BM		0.017 (0.014)		-0.001 (0.010)		0.002 (0.007)		-0.007 (0.007)		0.012 (0.010)		0.035*** (0.013)		0.025 (0.016)
Dividend yield		0.400* (0.236)		0.072 (0.167)		-0.075 (0.120)		-0.103 (0.122)		-0.266 (0.176)		-0.178 (0.213)		-0.126 (0.272)
Constant	-0.069*** (0.016)	-0.143** (0.055)	-0.038*** (0.011)	-0.067* (0.039)	-0.005 (0.008)	-0.041 (0.028)	-0.015* (0.008)	-0.026 (0.028)	-0.006 (0.011)	-0.009 (0.041)	-0.023 (0.014)	-0.009 (0.049)	-0.012 (0.018)	-0.001 (0.063)
Observations	338	338	338	338	338	338	338	338	338	338	338	338	338	338
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0,247	0,266	0,155	0,199	0,100	0,126	0,068	0,061	0,197	0,194	0,206	0,217	0,160	0,160

Notes: This table reports the results of cross-sectional regression for six CAR windows and for the event date 24.2.2022. Social pillar score (S Score) is the key independent variable, and all other variables are control variables. All regressions contain industry dummies and country dummies, and for each window, results without control variables are also reported. Control variables are winsorized at the 1% level in each tail. Standard errors are reported in parentheses. Statistical significance is indicated as 1% (***), 5% (**), and 10% (*).

Adjusted R² varies between the event windows, reflecting changing market attention toward firm-level fundamentals during the event period. In the pre-event windows adjusted R² is highest in the longest window (-10, -1) but it declines sharply as the event date approaches. During the event date adjusted R² remains at moderate level but begins to increase in the post-event windows. It reaches its highest value in the (+1, +5) window, which suggests that after the initial shock markets began to reassess stocks based on firm-specific characteristics, and the model variables started to regain explanatory power for cumulative abnormal returns.

Table 5 shows that the role of social pillar score changed radically after the war started. The relationship that appeared to be positive or neutral before the war changed to negative.

7.4 Governance pillar score

Table 6 below reports the results of the regression analysis utilizing the individual governance pillar score as the main independent variable. In the pre-event windows, the governance score is positive and has a statistically significant correlation with cumulative abnormal returns in (-10, -1) and (-5, -1) windows but significance disappears after the control variables are included. This suggests that the governance score does not provide independent explanatory power beyond other firm-specific characteristics in the pre-event windows. However, the same control variables appear to be statistically significant as in table 5. Return on equity (ROE) shows a positive and statistically significant relationship with cumulative abnormal returns in the (-5, -1) and (-3, -1) windows at the 1% level. In addition, dividend yield shows statistically significant results at the 10% level in the (-10, -1) window. The adjusted R^2 reaches its highest value in the (-10, -1) window and begin to decline when event date approaches, as in tables 3, 4 and 5.

During the event date governance scores are not statistically significant but the relationship has changed to negative. In addition, the control variable for firm size is positive and statistically significant at the 10% level. The adjusted R^2 remains relatively low during the event date, consistent with the other regression results.

In the post-event windows, the governance scores remain negative and statistically insignificant. However, as in table 3, 4 and 5, the control variable book-to-market (BM) is positive and statistically significant at the 1% level in the (+1, +5) window. Results show that adjusted R^2 increases again in the post-event windows reaching its highest value in the (+1, +5) window, which is in line with the other regression results.

Table 6. Governance pillar score and stock returns.

Dependent variable	CAR (-10.-1)	CAR (-10.-1)	CAR (-5.-1)	CAR (-5.-1)	CAR (-3.-1)	CAR (-3.-1)	AR 0	AR 0	CAR (+1.+3)	CAR (+1.+3)	CAR (+1.+5)	CAR (+1.+5)	CAR (+1.+10)	CAR (+1.+10)
G Score	0.055** (0.022)	0.040 (0.024)	0.028* (0.016)	0.019 (0.017)	0.008 (0.011)	0.005 (0.012)	-0.008 (0.011)	-0.020 (0.013)	-0.012 (0.016)	-0.003 (0.018)	-0.017 (0.020)	-0.008 (0.022)	-0.025 (0.025)	-0.019 (0.028)
Cash ratio		0.000 (0.038)		-0.002 (0.027)		0.013 (0.019)		-0.011 (0.019)		-0.004 (0.028)		-0.033 (0.034)		0.033 (0.044)
Leverage		-0.037 (0.036)		-0.010 (0.025)		-0.002 (0.018)		-0.017 (0.018)		-0.030 (0.027)		-0.031 (0.032)		0.011 (0.041)
ROE		0.034 (0.026)		0.072*** (0.018)		0.045*** (0.013)		0.004 (0.013)		0.006 (0.019)		0.010 (0.023)		-0.030 (0.030)
Size		0.004 (0.004)		0.002 (0.003)		0.001 (0.002)		0.004* (0.002)		-0.002 (0.003)		-0.003 (0.004)		-0.000 (0.005)
BM		0.019 (0.014)		-0.001 (0.010)		0.003 (0.007)		-0.009 (0.007)		0.013 (0.010)		0.036*** (0.013)		0.023 (0.016)
Dividend yield		0.405* (0.235)		0.078 (0.167)		-0.080 (0.120)		-0.102 (0.121)		-0.278 (0.176)		-0.188 (0.213)		-0.125 (0.272)
Constant	-0.076*** (0.015)	-0.125** (0.053)	-0.037*** (0.011)	-0.065* (0.038)	-0.011 (0.008)	-0.027 (0.027)	-0.004 (0.008)	-0.042 (0.027)	-0.018 (0.011)	0.014 (0.040)	-0.027* (0.014)	0.005 (0.048)	-0.004 (0.018)	-0.015 (0.061)
Observations	338	338	338	338	338	338	338	338	338	338	338	338	338	338
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0,254	0,272	0,154	0,201	0,101	0,122	0,065	0,068	0,187	0,186	0,203	0,214	0,163	0,161

Notes: This table reports the results of cross-sectional regression for six CAR windows and for the event date 24.2.2022. Governance pillar score (G Score) is the key independent variable, and all other variables are control variables. All regressions contain industry dummies and country dummies, and for each window, results without control variables are also reported. Control variables are winsorized at the 1% level in each tail. Standard errors are reported in parentheses. Statistical significance is indicated as 1% (***), 5% (**), and 10% (*).

Overall table 6 shows that the governance pillar score does not have explanatory power for cumulative abnormal returns. In contrast to these findings, Kovacs et al. (2024) found that companies with higher governance scores were associated with better positive abnormal returns almost in every event window that they used in their study.

8 Conclusions

This section summarizes the main findings of the study and discusses the implications in relation to main theories and previous literature. The analysis focused on the impact of ESG scores and individual ESG pillars on stock returns surrounding the start of the Russia-Ukraine war in Nordic markets. By examining event date, pre-event and post-event windows, this study provides insights into how investors respond to ESG factors during periods of geopolitical uncertainty.

Responsible investing has been very popular among investors in the last decade and companies ESG scores are one of the measures for responsible investing. In addition, research around the ESG and crises periods have increased especially after covid-19 (e.g. Albuquerque et al., 2020; Bae et al., 2021; Kovacs et al. 2024). The war between Russia and Ukraine offered another opportunity to examine ESG scores during the conflictual time. The war shocked the world in February 2022, and it had strong effect on global economy and stock returns. Stocks declined in Europe significantly and achieved negative average abnormal returns (AAR) and the sharpest decline occurred on the event date (Ahmed et al. 2023). This study examines if the companies ESG scores affected the stock returns surrounding the Russia-Ukraine war.

Findings of this study can be analyzed from the perspective of responsible investing discussed in chapter 2. Responsible investing has developed significantly over time, especially in the Nordic countries, where the ESG have become an important part of the investment decisions. Different responsible investing strategies, such as impact investing, sustainability themed and ESG integration, aim to consider environmental, social and governance aspects in investment decisions. However, the results suggest that during the geopolitical uncertainty, investors may at least temporarily set ESG factors aside, and that the effects may vary across different ESG pillars. As shown in table 5, social pillar scores are statistically significant and negative in the short (+1, +3) window. In contrast, environmental scores are statistically significant and positive in the (+1, +10) window.

This emphasizes that even though ESG factors play an important role in modern investment strategies, their effect on short-term stock returns may vary depending on ESG pillar, market conditions and external shocks.

This study used ESG score data and stock return data to examine how companies with different ESG scores reacted surrounding the start of the Russia-Ukraine war. The analysis is based on event study methodology, which is widely used in financial research, especially to measure short-term stock market reactions (El Ghouli et al., 2023; Mackinlay, 1997). By focusing on short pre-event and post-event windows around the event date, the methodology allows for the identification of cumulative abnormal returns surrounding the event.

Taking the previously mentioned text into consideration this thesis examines if the ESG scores affected stock returns surrounding the start of the Russia-Ukraine war. Earlier studies have focused on CSR or ESG scores during the different market crises but there is limited research focusing specifically on Nordic markets, where corporate responsibility plays an important role (Robeco, n.d. -a, n.d. -b & n.d. -c). As shown in chapter 5 the previous literature has shown mixed results of the relationship between ESG scores and stock returns during different crises.

The results of this study show that the total ESG score did not provide protection in the stock markets surrounding the start of the war. Total ESG scores did not have a statistically significant effect on stock returns in the pre-event windows when control variables were included in the regressions. During the shortest pre-event window ESG score became negative and this negative effect continued also in the post-event windows (+1, +3) and (+1, +5), but there was no statistical significance in any window.

In addition, the individual environmental, social and governance pillars are used as the key independent variable. The environmental score does not show a statistically significant relationship with stock returns during the pre-event windows once control

variables are included. However, after the event date environmental score became negative, and returned to positive in the (+1, +5) window and statistically significant at the 5% level in the longest post-event window. In contrast, social pillar shows statistically significant negative effect after the war started and it occurs in the first post-event window. Governance pillar score does not show any statistically significant negative effects after the control variables are included.

Overall, the results show that neither the total ESG score nor the individual social and governance pillar scores provided protection surrounding the war. Only the environmental pillar exhibited a positive and significant relationship with cumulative abnormal returns in the longest post-event window (table 4), suggesting that it may have provided some protection.

The results challenge, at least in shortest post-event window and specifically regarding the social pillar score, the traditional stakeholder theory, which states that companies should aim to build good relationships with both shareholders and other stakeholders simultaneously. The negative and statistically significant association between the social pillar scores and cumulative abnormal returns suggests that markets may prioritize factors more consistent with traditional shareholder theory, such as profit-generating ability. Shareholder theory argues that a business has a single primary social responsibility, to use its resources and participate in activities aimed at generating profit (Friedman 1970). However, it is important to consider that these results do not imply a causal link between high social pillar scores and poor stock returns. It is possible that companies with high social pillar scores had other structural characteristics such as geographical exposure or industry specific vulnerabilities that made them more sensitive to war.

As mentioned earlier, the findings in this research field are mixed, and this study also contributes new evidence to the literature. The findings of this study are consistent with the previous literature suggesting that ESG factors are not always prioritized during

periods of crisis and provide new insights into how total ESG scores and individual ESG pillar scores relate to different crises. The results differ from several previous studies that have found a positive relationship between ESG scores and stock returns during crisis periods. For example, Lins et al. (2017) found in their study that firms with strong CSR performance outperformed those with lower CSR scores by 4–7 percentage points in stock returns. In contrast Bae et al. (2021) did not find significant evidence that CSR engagement had an influence on stock returns during the covid-19 pandemic. In addition, Albuquerque et al. (2020) found in their study that firms with high ES scores outperformed others in stock price performance, particularly during the covid-19 market collapse.

Although these previous studies are not directly comparable to this study, as they focus on different crisis periods, the overall market reaction has been similar across crises, with stock prices generally declining. There are also studies that have focused on Russia-Ukraine war (Kick and Rottmann, 2024 and Kovacs et al., 2024). Kick and Rottmann (2024) found similar results in their study that firms with higher ESG scores, particularly those with higher environmental scores, experienced less negative abnormal returns. In contrast, Kovacs et al. (2024) found that especially the governance pillar had a positive relation with cumulative abnormal returns during the Russia-Ukraine war which, indicates that investors value firms' corporate governance during the uncertain times.

However, the findings of this study do not provide exactly similar evidence in Nordic markets. As shown in tables 3, 4, 5 and 6 there is no positive relationship between ESG or individual S and G pillars and stock returns. Only environmental pillar shows statistically significant and positive relationship in the longest post-event window which is similar finding to Kick and Rottmann (2024). In addition, a statistically significant negative relationship is observed in the shortest post-event window (+1, +3) for the individual social pillar scores. Broadstock et al. (2021) found also similar results, but they also found that individual governance pillar scores have positive impact on their study's event window returns.

This research also has limitations and one of them is the reliance on a single database to obtain ESG scores. As Berg et al. (2022) mentions in their study that ESG ratings from data providers can be completely different. They found in their study that the correlations between the ESG scores of six rating agencies: KLD, Sustainalytics, Moody's ESG, S&P Global, LSEG (formerly Refinitiv or Asset4), and MSCI, ranged from 0.38 to 0.71. This kind of variation indicates that research findings may be different, depending on which ESG data provider is used. For example, Bae et al. (2022) and Lins et al. (2017) used LSEG (formerly known as Refinitiv) and MSCI database ESG scores in their research. Based on this a valuable addition for future research would be to incorporate ESG scores from multiple providers. Regression outcomes between different ESG datasets would help to add robustness to the relationship between ESG performance and stock returns. This could also provide a deeper understanding of how data provider selection and their ESG weighting systems influences empirical results.

Another limitation is the relatively short event period, which may limit the results generality. However, it is important to note that this study is an event study, and the main idea is to focus on the short-term market reactions. If the research period is too long, then an event study might not be the appropriate method to examine this kind of issue.

Although this study provides new valuable information about the relationship between ESG scores and stock market reactions during crisis, there remain opportunities for future research. Future research could focus on limitations mentioned above, for example employing ESG data from multiple data providers. In addition, future studies could explore the study by focusing on specific subcategories that environmental, social and governance scores include. Furthermore, while this study focused on immediate market reactions by using short event windows, future research could examine the long-term relationship between ESG performance and stock returns after the war begun.

However, as mentioned earlier it should be noted that the event study methodology may not be the most appropriate for that purpose.

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