Norwegian School of Economics
Bergen, Spring 2023

Market Reactions to ESG News

How do negative firm specific ESG news affect the market value of public companies in Europe and the US?

Tobias Prestby and Malin Moen

Supervisor: Konrad Raff

Master thesis, Economics and Business Administration

Major: Financial Economics

NORWEGIAN SCHOOL OF ECONOMICS

Acknowledgements

This thesis marks the completion of our studies in the Master of Science in Economics and Business Administration program at the Norwegian School of Economics. The selection of the thesis topic was driven by our specific interest in the ESG development and the financial markets. We found the journey of writing this paper to be challenging, educational, and above all, captivating.

We extend our gratitude to our supervisor, Konrad Raff, whose feedback, and expertise in corporate finance guided us throughout the process. Furthermore, we would like to express our appreciation to our families for their support throughout our years of study.

Last but certainly not least, we express our heartfelt appreciation to one another for the partnership we have formed throughout this endeavor.

Norwegian School of Economics

Bergen, June 2023

Abstract

In this master thesis, we examine how negative ESG news specific to individual firms impact the market value of publicly traded companies in the US and Europe over a short term period. We assess news events of 329 listed companies in the period between 2010 and 2020. Initially, we conduct an event study with the full sample to test a general but fundamental hypothesis and analyze whether we can find negative abnormal returns that are significantly different from zero following firm specific negative ESG news.

Moreover, to provide further insight, we perform three additional event study analyzes with split samples. To examine whether companies with higher ESG commitment are being penalized by the market, we split the sample using UN Global Compact membership as a proxy. Furthermore, we split the sample based on the reach of the media source that reported the incident, and lastly whether the incident was new or recurring for the individual firms.

Our analysis reveals a significant negative abnormal return for ESG incidents that were considered novel for the companies. Additionally, incidents reported by limited reach media sources also show a marginally significant negative impact. Moreover, our findings indicate that companies operating within specific industries tend to face more pronounced negative abnormal returns when the news incidents are related to environmental issues. Furthermore, we find marginally significant results of companies with higher ESG commitment experiencing larger negative abnormal results. However, concerning our general research question, we cannot find evidence suggesting that ESG news has a significant negative effect on a public company's market value in the short term.

Contents

List of Tables

List of Figures

1. Introduction

Sustainable finance has experienced significant growth in recent years with corporations, investors, and funds integrating environmental, social and governance (ESG) aspects into their business models and investment strategies. The ongoing global environmental crisis serves as a driving force behind this development, with emerging initiatives such as the UN sustainability goals, the European Green Deal, and voluntary programs like the UN Global Compact (UNGC) and Principles of Responsible Investment (PRI). Additionally, the scope of international regulations and directives has increased and improved, such as the EU Taxonomy, and The EU's Corporate Sustainability Reporting Directive (Burkinshaw, 2022). ESG has emerged as a crucial factor in decision making, risk assessment, and creating opportunities for long term value. With stakeholders placing a growing emphasis on corporate responsibility, the management of ESG issues is increasingly essential to a firm's operational performance and social reputation. Neglecting ESG considerations may therefore jeopardize future profitability, as highlighted by Jørgensen and Pedersen (2018).

The ESG development offers a nuanced view of the tradeoff between shareholder value and societal value, which has been extensively discussed in previous literature (Freeman 1984; Friedman 1970). Companies increasingly prioritize corporate responsible performance, which may cause them to sacrifice short term profits in favor of pursuing long term value creation. However, balancing social and financial return introduces the issue to which extent an investor or a company are willing to compromise one for the other. There are comprehensive research examining the relationship between ESG criteria and a company's financial performance, and market returns. However, the knowledge of this relationship remains fragmented. According to Edmans' (2011) research on employee satisfaction, companies with high levels of such CSR resources tend to achieve superior returns long term. However, the market may fail to fully incorporate these intangible assets into stock valuations in the short term. Moreover, in their comprehensive research combining 2,200 previous studies, Friede et al. (2015) discover a positive relationship between ESG criteria and corporate financial performance in the majority of studies. Furthermore, some previous studies examining stock market returns following ESG news find a significant impact (Capelle-Blancard and Petit 2019; Flammer 2013; Krueger 2015). On the other hand, others find that there is no significant effect on returns following ESG news, or that it varies depending on the context or the materiality of the incident (Schmidt 2019;

Serafeim 2021; Serafeim and Yoon 2022).

In our thesis, we aim to delve deeper into this issue by studying short term market value changes through abnormal stock returns following negative firm specific ESG news. To conduct our analysis, we collect publicly listed firms from 21 European countries as well as listed firms in the US. We use the database published from RepRisk to gather data of individual firms' incidents over a sample period from 2010 to 2020. For the stock prices we incorporate CRSP for US firms, and yahoo finance for the European stock prices. Furthermore, we use Refinitiv Eikon to gather financial metrics essential for our study. In total, the sample comprises 329 distinct publicly traded companies that encountered an ESG incident between the years 2010 and 2020.

To evaluate the effect of negative ESG news on returns, we conduct an event study for each individual firm, and analyze the cumulative average abnormal return (CAAR) for 5 short term event windows. Furthermore, we examine whether the market penalizes firms with higher ESG commitment, using UNGC membership as a proxy for ESG commitment. Thereafter, we perform an event study based on the reach of the media source reporting the incident, and subsequently assess whether the novelty of the specific incident affected abnormal returns. Finally, through multiple regression analyses, where we distinguish between social, and environmental incidents, we examine how returns are affected in various industries.

Our analysis detects no significant abnormal returns when examining the full sample. However, when splitting the sample based on ESG commitment, we find a significant negative abnormal return for companies that were signatories of the UNGC. Hence, suggesting that the market penalizes violation of green commitment. Furthermore, our analysis reveals a significant negative effect for ESG incidents that were novel for individual firms, as well as incidents covered by low reach media sources. We also find a significant negative industry effect when news were related to environmental issues, with the largest impact in the chemical production, and transportation industries.

Our thesis contributes to the existing literature concerning the relationship between ESG and market value, specifically ESG incidents and how the market reacts to this news. By utilizing data from both the US and European countries, our thesis can be differentiated from previous research that focus solely on a specific region such as the US. Furthermore, it aims to provide

more insight into how markets react to violation of green commitment, and how specific industries are affected differently by environmental and social news incidents.

The subsequent sections of this thesis are organized as follows. The second section undertakes an exploration of the theoretical and empirical literature examining the connection between ESG factors and financial performance along with the relationship between ESG-related news and market reactions. Hypotheses are presented in the third section. The methodology for calculating the CAAR using an event study is explicated in section 4, wherein the empirical approach employed in the regression analysis is also presented. Section 5 provides a detailed description of the sampling procedures, accompanied by summary statistics for the full sample. Our findings, and supplementary discussion is presented in section 6. Thereafter, research limitations are covered in section 7, as well as suggestions for future research. Finally, in Section 8, the study is summarized with an overall conclusion.

2. Literature review

2.1 The Effect of ESG on Firm Value and Market Returns

A widespread perspective in politics and public opinion is that corporations should serve a larger social purpose by acting responsible and engaging with stakeholders beyond just shareholders. Friedman (1970) argued that the only responsibility of a corporation is to create wealth for shareholders. He regarded CSR as a cost that would decrease profits and violate the managers' fiduciary responsibility to shareholders. Conversely, Freeman (1984) introduced the stakeholder theory suggesting it would be in a company's interest to consider a broader group of stakeholders. Stakeholder theory stipulates that management and directors should internalize the externalities that their decisions impose on employees, communities, creditors, and ethical considerations. On the other hand, the shareholder-value position is that externalities are best handled by contractual and legal apparatus. Concerns about the stakeholder theory include potential financing discouragement and conflicting objectives among stakeholders, leading to inefficient decision making. Additionally, it introduces potential agency problems with self-serving managers. A manager focused on maximizing shareholder value has a well-defined mission, while the socially responsible manager faces a wider variety of missions, many of which are difficult to measure (Tirole, 2006).

The introduction of stakeholder capitalism seems to align interests, where corporations increasingly trade off short term profits for shareholders, to create long term value creation by considering the needs of all stakeholders, and society at a whole (World Economic Forum, 2021). Responsible business practices can increase firm value for instance by alleviating information asymmetries and transaction costs by being perceived as responsible and trustworthy (Frank 2003; Servaes and Tamayo 2013). Moreover, recent surveys show that consumers are increasingly favoring sustainable products and companies, which may directly affect earnings (PwC, 2023). Additionally, employees are increasingly demanding employers to look beyond only financial performance to broader ESG considerations (PwC, 2022). Edmans (2011) characterizes employee satisfaction as an intangible asset and finds that high levels of employee satisfaction generate superior returns long term. However, his findings suggest that even though the existence of such intangible assets is verified, the market fails to fully incorporate it into stock valuations in the short term.

There are mixed evidence of investment in ESG providing societal benefit without sacrificing financial returns relative to performance of traditional portfolios (Boffo and Patalano, 2020). However, Friede, Busch, and Bassen did a study in 2015 combining the findings of 2200 previous individual studies concerning the relationship between ESG criteria and corporate financial performance. Their findings show that 90 percent of studies concluded with a nonnegative relationship, and the majority of studies reported positive findings over time, discouraging the idea that ESG destroys value.

In previous research studying market returns following various ESG news, Krueger (2015) finds that investors respond strongly negatively to negative events and weakly negatively to positive news events. Similarly, Capelle-Blancard and Petit (2019) discover that firms tend to experience a decrease in market value of 0.1% on average when faced with negative events and ESG news. Additionally, Flammer (2013), finds that companies exhibiting responsible behavior towards the environment experience a significant increase in stock returns, while firms that display irresponsible behavior sustain a significant decrease.

On the other hand, according to Serafeim (2021), the majority of ESG news do not elicit significant reactions from capital markets, indicating that such news are not considered relevant for evaluating a company's value. In his 2022 event study with Aron Yoon, they find that

financial motives drive investor reactions rather than non-pecuniary motives (Serafeim and Yoon, 2022). They find that market reactions are significant only to news categorized as financially relevant according to the industry the company belongs to. Furthermore, various industries face unique challenges and the relevance of ESG news is likely to be different depending on the activity of the firm (Griffin and Mahon 1997; Kotchen and Moon 2011). Capelle-Blancard and Petit (2019) discover that environmental issues cause the largest impact for the chemical industry and basic resources, and social issues are most essential for consumer goods and services, as well as industrial goods. Finally, Schmidt (2019) also highlights that the firm's ESG activities seem to be highly context specific. The duration of the shock, the type of news, and the stock's present financial performance are imperative for the change in idiosyncratic returns.

2.2 The effect of ESG Commitment

Previous research often explore a company's commitment to ESG by examining its corporate social performance, activities, and reputation. According to Flammer (2013), the negative impact on a firm's reputation is greater when it receives negative ESG news, as the adoption of sustainability practices become more institutionalized. This is because firms are being penalized for not adhering to the norm. Furthermore, she finds that companies with larger stock of environmental resources benefit relatively less from additional initiatives, indicating that environmental resources exhibit decreasing marginal returns. Investors may perceive environmentally responsible companies as having more insurance against negative events, and seeing the incident as an anomaly, thus mitigating negative reactions. Hence, Flammer's research suggests firms with higher ESG commitment experience lower negative reaction following negative news incidents. Capelle-Blancard and Petit (2019) support this "reservoir of goodwill" hypothesis in finding that positive ESG reputation and past media coverage on ESG issues in a sector could shield against potential shareholder losses following negative ESG news.

Conversely, Servaes and Tamyo (2013) suggest that corporations engaging in, and publicizing CSR activities can increase its value if activities align with firm reputation. However, the enhanced public awareness increases scrutiny. As a result, firms with high CSR performance and public awareness are penalized more in violation of such considerations. Similarly, in their studies exploring responsible firms as potential targets for activists, Baron (2009), and Baron

and Diermeier (2007) find that companies with highly prominent CSR initiatives face increased public scrutiny and may incur larger negative reactions. This is also empirically supported by Luo et al. (2012), who found that while Exxon was considered the "brownest" oil business and BP the "greenest," BP accidents were more likely to be reported than Exxon accidents. Lyon and Maxwell (2011) also states that businesses could be reluctant to highlight environmental accomplishment since activists tend to react badly when firms claim to do well while actually performing poorly.

2.3 Corporate Social Reputation and Media Exposure

Cahan et al. (2015) suggest that companies with high levels of social responsibility tend to enjoy a more positive overall news image. Subsequently, this contributes to enhancing the company's reputation, increasing investor trust, and potentially leading to economic benefits arising from increased positive public awareness. They suggest a significant relationship between social responsibility and media favorability that raises (lowers) a firm's equity valuation (cost of capital). Moreover, Aouadi and Marsat (2018) find that corporate social performance only has an impact for larger, high attention firms with a positive corporate social reputation. These firms are typically more followed by analysts, more researched online and are located in countries with greater press freedom. Additionally, Fang and Peress (2008) discover a strong correlation between media attention and both idiosyncratic volatility and analyst forecast dispersion. They find that media coverage accelerates the incorporation of information into prices, while not necessarily resulting in a convergence of opinions. These findings suggest that the mass media's impact on security pricing results primarily from its ability to widely transmit information, rather than from its ability to influence opinions or create consensus.

According to Teng and Yang (2021), the media can act as an external corporate governance system and be crucial in observing company behavior. They discover that the number of corporate social irresponsible incidents, whether made public by the media or by the company itself, are significantly and adversely related to the operating and financial results of the company. Glossner (2021) suggests that a company's past ESG incident rate is a predictor of more future incidents and weaker profitability. However, he emphasizes that the impact of poor ESG practices on firm performance may both be because of shareholder focus and cost efficiency, or managerial short-termism. The market may underreact to negative ESG information due to difficulties with evaluating costs of ESG investments against increased business risk. Furthermore, Derrien et al. (2022) also suggest that stock market reactions are

larger when companies have experienced multiple negative ESG incidents. Conversely, Serafeim and Yoon (2022) find the strongest market reactions from new and unexpected news.

2.4 ESG Ratings

Investors increasingly rely on ESG ratings to get a third-party assessment of firms' ESG performance. Berg et al. (2019) suggest that these ratings are increasingly influential in decision-making processes, potentially exerting a significant impact on corporate strategies and asset prices. Moreover, they find a significant disparity between ESG ratings from various suppliers. As a result, evaluating the performance of businesses, funds, and portfolios in terms of ESG factors is a challenging task. Furthermore, their findings suggest that ESG rating discrepancy is not just a result of different definitions but also a fundamental dispute over the underlying data.

Serafeim and Yoon (2022) also observe that the predictive strengths of ESG ratings vary across different providers. Their study indicates how ESG ratings influence investor expectations for upcoming news and how rating discrepancies are linked to a lack of stock price reaction. Serfaeim (2021) notes that measuring and reporting on ESG can change behavior if there are strong incentives tied to those metrics. Therefore, the issue of “greenwashing” where there is discrepancy between a firm’s ESG reporting and performance pose a serious challenge.

Furthermore, a common criticism of ESG reporting and rating is the lack of transparency. However, Christensen et al. (2021) find that increased ESG transparency in fact results in more ESG rating disagreement. Additionally, they discover that higher rating disagreement is associated with higher return volatility, larger price fluctuations, and lower likelihood of receiving external funding. In sum, their research suggests that ESG disclosure often exacerbates rating controversy rather than resolving it.

2.5 Effect on Cash Flow and Cost of Capital

Considering a simple dividend discount model, the effect on market return can be decomposed into two components, a change in expected free cash flow of the firm and a change in discount rate reflecting the company's cost of capital (De La O and Myers, 2021). Therefore, if ESG metrics are predictors of the firm’s future earnings potential, then shareholders might downward revise earnings forecasts, and the news could lead to a decrease in market value and vice versa.

According to Derrien et al. (2022), most of the negative impact of ESG news on firm value can be explained by forecast revisions. They hypothesize that poor ESG performance can result in lower firm value because the firm is avoided by many investors, causing higher cost of capital and discount rate. Analysts significantly downgrading their short- and long term forecasts, reflecting expectations of lower future sales could reduce firm value.

The argument of risk reduction is frequently used in favor of integrating ESG considerations. Exploring the potential link between ESG exposure and risk, Dunn et al. (2018) find a significant correlation. Weak ESG exposures correlate with higher total and stock-specific risk, and larger betas. Equities with the lowest ESG exposures have up to 3 percent higher betas and 10-15 percent greater total and stock-specific volatility than those with the best ESG exposures. Similarly, Lodh (2020) finds that high ESG-rated businesses face lower systematic risk. He also discovers that such businesses have lower average debt costs, which is consistent with the notion that improved corporate governance reduces default risk and affects the cost of debt. Additionally, Oikonomou et al. (2012) also suggest that socially responsible companies have lower market risk, while socially irresponsible companies have higher market risk, particularly during times of high volatility.

3. Hypotheses

On the basis of previous studies and literature, we formulate several hypotheses to effectively address our research question. Corporate events concerning ESG are frequently featured in news media, however, it does not mean they significantly impact a firm's market value. Prior research on market reactions to ESG news is fragmented, and therefore we initially test a general but fundamental hypothesis to explore whether we can find abnormal returns that are significantly different from zero in our full sample. In line with our research question "*How do negative firm specific ESG news affect the market value of companies in Europe and the US?",* we estimate abnormal returns for all sample companies and then aggregate them to calculate a cumulative average abnormal return.

Hypothesis 1: Negative ESG news has a negative effect on stock returns.

Through the following hypotheses, we aim to further investigate the mechanisms and rationales behind the market's reactions to ESG news. For our second hypothesis, concerning ESG commitment, we do a second event study where we split the observations into signatories of the UN Global Compact and non-signatory companies. We want to examine if there are significant abnormal returns in the sample of firms that have signed the UN Global Compact (UNGC), and whether there is a difference compared to non-signatory firms. Flammer (2013) finds that the changes in market returns following environmental news is smaller for companies with higher ESG performance. Conversely, in alignment with our hypothesis, Baron and Diermeier (2007), Baron (2007) and Servaes and Tamyo (2013) suggest that companies with high corporate social performance are subject to increased public scrutiny and experience larger negative effects in case of unfavorable news.

Hypothesis 2: Firms with higher ESG commitment experience a larger negative abnormal return.

Further, we wish to assess the effect of media exposure. We attempt to provide insight on this issue by testing whether the media source of the news has an impact. To accomplish this, we perform another event study where we split the sample based on limited, medium, and high reach of the media source reporting the observed incident. We expect the high source to be more influential due to greater reach and neutrality compared to less independent sources of ESG news. Hence, we expect the news events of companies that receive more media attention to cause larger negative abnormal returns.

Hypothesis 3: Negative firm specific ESG news covered by high reach media sources causes larger negative abnormal returns.

In our final event study analysis, we aim to investigate whether the novelty of an incident impacts abnormal returns. By splitting our sample into new and recurring events we assess whether there is a significant difference in abnormal returns. We are using data from the RepRisk database, which specify recurring events as specific ESG issues in a certain location, that have occurred earlier for the particular firm. Previous research present conflicting findings on this issue. Serafeim and Yoon (2022) find that the largest reactions are caused by unexpected

news. Conversely, Derrien et al. (2022) and Glossner (2021) suggest firms that have past incidents predict more future incidents and lower returns. We expect to find larger negative abnormal returns in the sample of recurring incidents.

Hypothesis 4: Firms that have experienced the same type of incident before will encounter larger negative abnormal returns.

Additionally, we want to explore the effect on returns for various industries with different types of news content. Since the various industries face unique challenges, we anticipate that the impact of different ESG news will vary across industries. This is consistent with previous research suggesting that external pressure, and impact on returns will vary across industries (Capelle-Blancard and Petit 2019; Griffin and Mahon 1997; Kotchen and Moon 2011). For instance, concerning environmental issues, we expect a larger negative effect in the oil industry, or the chemical production industry, compared to others. Incidents concerned with social issues are expected to cause larger impacts for industries that often face criticism for poor working conditions, labor practices or safety concerns. To assess the effect, we perform three regressions where we split the sample based on type of news and include dummy variables for the different industries.

Hypothesis 5: For different types of ESG news, the effect on abnormal returns will vary across industries.

4. Methodology

4.1 The Event Study

The event study methodology allows us to assess whether there are significant abnormal returns following negative ESG news unique to a firm. An event study estimates the effect of a certain occurrence on the firm's value using information from the financial markets (MacKinlay, 1997). The main focus is on calculating the average and cumulative mean abnormal return for the sample securities around the time of an event (Eckbo, 2008). Such a study is advantageous because, assuming market rationality, security prices will promptly reflect an event's impact.

Event studies are a crucial component of capital market research because they allow researchers to test the effectiveness of the market. After a particular type of corporate event, abnormal security returns that persist to be nonzero are not consistent with market efficiency (Eckbo, 2008). Event studies that concentrate on long horizons after an event can therefore offer crucial information on the efficiency of the market (Brown and Warner, 1980; Fama, 1991). However, results from short-horizon testing can be more trusted and given more weight than those from long-horizon tests. With short-horizon approaches, the test statistic specification is less sensitive to assumptions about the cross-sectional or time-series dependency of abnormal returns or the benchmark model of normal returns.

We structure the event study based on the framework of MacKinlay (1997) with the added step of a cross-sectional regression. The process is as follows:

1. Define event of interest
2. Identify event window
3. Determine selection criteria for included firms
4. Define estimation window
5. Select a normal performance model
6. Calculate abnormal returns
7. Define hypotheses
8. Presentation of empirical findings

4.2 Event Window

The first part of conducting an event study is to define the event of interest and to identify the time frame known as the event window, where the security prices of the companies are examined (MacKinlay, 1997). Since we want to assess short term effects, we use relatively short time intervals for the event windows. If the abnormal performance is concentrated in the event window, short-horizon approaches can be highly effective (Eckbo, 2008).

News of incidents may not be released on the day it actually happened, which may have been the day before during stock market opening hours. As a result, the event window typically includes time before and after the event itself. Therefore, we apply an event window with intervals between -1 to 2 days.

Table 1: Event Window

Event window Start	Event Window End
-1	2
-1	0
-1	1
0	1
0	2

Note: *The table illustrates the different event windows used in the event study conducted in our study. All subsequent days are referred to in respect to the event day, which is represented by 0, and is the day that ESG news is published.*

A fundamental tenet of the event study approach is the idea that the event window being explored is unaffected by the confounding impact of another event. Events that could affect the share price during the event window are referred to as confounding events. Short event windows are advantageous because they reduce the risk of this happening. However, there is still the risk of overlap and thus abnormal returns overlapping, which may violate the independence assumption (MacKinlay, 1997).

4.3 Normal Return and Estimation Window

Before an abnormal return can be estimated, a model of normal returns must be specified. Event studies make use of a range of expected return models, including the market model, the constant expected returns model, and the capital asset pricing model. The different approaches are influenced by the bias and precision of the expected return measure (Eckbo, 2008).

In this event study we are using the market model to estimate expected returns. To estimate these returns, a pre-event period sample is used to estimate the parameters using OLS (ordinary least squares) regression. The abnormal returns are then estimated using the parameter estimations along with the stock and market index returns from the event period. This technique accounts for the risk (market factor beta) of the stock and market movement during the event period (Binder, 1997). The market model has the advantage of reducing the component of the return that is attributable to volatility in the market's return, which may increase the ability to detect event effects (MacKinlay, 1997).

The market model is a statistical framework that links a security's return to the performance of the market portfolio and the model for any security *i* is formulated below.

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}, \quad (1)$$

where $R_{i,t}$ is return on stock i in period t, and $R_{m,t}$ is return on the market portfolio m in period t. The error term, denoted by $\varepsilon_{i,t}$ has the expected mean value of zero. For each stock within the estimation window, the market model parameters, α_i and β_i are estimated using OLS regression.

The normal returns are calculated in the time period preceding the event window. This estimation window is intended to capture a return process that is assumed to be unaffected by the event (MacKinlay, 1997). The most typical approach is to use the period prior to the event window when choosing estimation window. In an event study using daily data and the market model, the model parameters are commonly estimated using the window length ranging from 60, 120, and 200 trading days. In order to avoid the event's influence on the estimates of the normal performance model parameters, it is customary to exclude the event period from the estimation period. We are using the period preceding the event window and 200 trading days for the estimation window.

4.4 Abnormal Returns

The abnormal return is determined as the difference between the actual ex post stock return observed during the event window and the firm's normal return, which is defined as the expected return regardless of the occurrence of the event (MacKinlay, 1997). For firm i and date t, the abnormal return is as calculated with formula 2.

$$AR_{i,t} = R_i - E\left(R_{i,t}|R_t\right), \tag{2}$$

Where $AR_{i,t}$, R_i and $E(R_{i,t}|X_t)$ are the abnormal, actual, and normal returns for the time period t. Instead of using simple returns, we are using continuously compounded logarithmic returns, which are more likely to have a normal distribution and hence satisfy the normality criteria in parametric testing (Strong, 1992). Formula 3 is used to calculate daily logarithmic returns.

$$R_t = ln\left(\frac{P_t}{P_{t-1}}\right) \tag{3}$$

Where P_t is the closing price on day t, P_{t-1} is the closing price the day before, and R_t is the daily

return. When including the estimated parameters from the market model, the formula for abnormal returns is illustrated below.

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t}, \quad (4)$$

Where $AR_{i,t}$ is the abnormal return, and $R_{i,t}$ is the stock return, respectively. $R_{m,t}$ is the market return in the event window. The estimated parameters from the market model are $\hat{\alpha}_i$ and $\hat{\beta}_i$, where the latter represents the systematic risk of security, *i*. $\hat{\alpha}_i$ represents the average return in excess of the market portfolio.

Aggregation of Abnormal Returns

To derive comprehensive inferences from the events of interest, it is imperative to aggregate abnormal return observations across two different dimensions, namely securities and time (MacKinlay, 1997). To fully capture the impact of an event, it is essential to aggregate data over time due to the uncertainty surrounding the entry of event information into the market, while aggregating across securities is essential to mitigate the noise from individual stock returns data, (Strong, 1992).

To determine the impact for each specific day, abnormal returns for all securities within the event window are aggregated using formula 5, where the securities have events denoted as *i* and are equally weighted.

$$AAR_t = \frac{1}{N}\sum_{t=1}^{N} AR_{i,t} \quad (5)$$

AAR_t is the average abnormal return for the individual events on day *t*, and $AR_{i,t}$ are the abnormal return at day *t* for event *i.*

To assess the impact across time, abnormal returns are aggregated within the designated event window. This aggregation enables the calculation of the cumulative abnormal return (CAR) for each event, as depicted in formula 6.

$$CAR_i(t_1 t_2) = \sum_{t=t_1}^{t_2} AR_{i,t} \quad (6)$$

The cumulative abnormal return CAR_i for event i within the event window from t_1 to t_2 is defined as the cumulative sum of the abnormal returns $AR_{i,t}$ for all time periods t within the specified window.

Finally, the cumulative abnormal returns are further aggregated across each event, leading to the calculation of the cumulative average abnormal return (CAAR). The aggregation of abnormal returns across both time and events provides the possibility of the running tests for all events, and the CAAR is determined by formula 7.

$$CAAR = \frac{1}{N} \sum_{i=1}^{N} CAR(t_1 t_2) \quad (7)$$

where *CAAR* is the average of all CARs from *N* events within the event window *t*=-1 to *t*=2.

4.5 Significance Testing of Abnormal Returns

The traditional event study examines the null hypothesis that the event does not cause an unexpected change in firm value. Conversely, the alternate hypothesis posits that the event causes an unexpected change in firm value. Under the null hypothesis the mean abnormal performance equals zero, and a test statistic is often produced for a specific performance measure and compared to its presumed distribution. We perform one sided t-tests, comparing the CAAR within the different event windows to a hypothesized mean of zero, and examine if the estimation significantly differs from zero. Further, we compare the test statistic to the critical value corresponding to the significance levels with 1, 5 or 10 percent tail region. If the test statistic is larger than the critical value and the p-value is within the critical levels, the null hypothesis is rejected. We then assume there are significant average abnormal returns following negative ESG news events. The null hypothesis is tested using the following t statistic estimated with formula 8 (MacKinlay 1997).

$$t_{CAAR} = \frac{CAAR(t_1,t_2)}{\sqrt{var(CAAR(t_1,t_2)}} \sim N(0,1) \quad (8)$$

The denominator in this case represents the estimated standard deviation CAAR and *t* is normally distributed. The variance is calculated using formula 9.

$$var(CAAR(t_1, t_2) = \frac{1}{N^2}\sum_{i=1}^{N}(CAR_i(t_1, t_2) - CAAR(t_1, t_2))^2 \quad (9)$$

To causally test the significance of the abnormal returns the events should be exogenous, the returns normally distributed, and there should be no event clustering (Getz, 2019).

4.6 Cross-sectional Regression

Most event studies include cross-sectional tests as a regular component, and they are important even when an event has no mean stock price effect (Eckbo, 2008). This supports the idea of differentiating between various economic hypotheses. The regression estimates a relationship between the company's abnormal return and firm specific characteristics. The cross-sectional variation in abnormal returns can be attributed to the fact that the economic impact of the event differs across firms.

According to MacKinlay (1997), the fundamental approach involves performing a cross-sectional regression of the abnormal returns on the pertinent characteristics. Given a sample of *N* return observation and *M* characteristics, the regression model is as follows:

$$CAR_j = \delta_0 + \delta_{1j} + \cdots + \delta_m x_{mj} + \eta_j, \quad (10)$$

Where C*AR*$_j$ represents cumulative abnormal return of observation *j*, x_{mj}, m = 1, …, *M*, are *M* represents M characteristics for observation *j* while η_j is the error term that is uncorrelated with the *x*'s. δ_m, m = 0, ..., *M* are the regression coefficients. The regression model can be computed using ordinary least squares (OLS), which yields the most efficient estimates when the classical assumptions for linear regression are met (Zhu, 2022) (Appendix 1).

The usual OLS standard errors can be used for inferences if the η_j's are cross-sectionally uncorrelated and homoscedastic. However, MacKinlay and Karafiath both recommend using

heteroskedasticity-consistent standard errors since there usually is no reason to expect the residuals to be homoscedastic. The problem of heteroskedasticity is that the variance captured by the error term is correlated across observations, which is the case if abnormal returns are caused by a common event. Nonetheless, we are using firm-specific news events and unique event periods, which should remedy this problem. In addition, Sefcick and Thompson (1986) also address this matter concerning the inference of coefficient estimates. They find that, when using unique event periods, the covariance matrix of disturbances has less impact. The disturbances during these periods are usually not correlated between firms, regardless of the level of contemporaneous cross-correlation. Moreover, we still address homoskedasticity when checking the OLS assumptions.

To test whether the estimated regression coefficients bear any statistical significance we use a one-sided t-test. We use the null hypothesis that the estimated coefficient is equal to zero and test it at significance levels of 1, 5 and 10 percent. To check whether we reject the null hypothesis we compare the t-stat with the critical value or look at the p-value. If we get a high p-value for the coefficient in question it is likely that the coefficient in fact is equal to zero, hence it does not significantly impact abnormal return, and we do not reject the null hypothesis.

Firm Specific Characteristics

We use the cross-sectional regression analysis to examine our last hypothesis on whether abnormal returns are affected by the industry in which the company operates. We assume the various types of news are value-relevant across industries, and we aim to explore this relationship's impact on abnormal returns. Firstly, we perform a regression with the full sample, and to examine the industry effect within different types of news, we run multiple regressions with a sample split on environmental and social news incidents.

The companies in our sample are divided into 16 industries, whereas we include a dummy variable for each industry in our regression. Instead of omitting one dummy variable to avoid multicollinearity problems, we remove the intercept instead. As an alternative to interpreting the results compared to the reference industry represented by the intercept, we find it more sensible to include them all and use a baseline of zero.

In addition, we include multiple control variables that we find reasonable to avoid omitted

variable bias. We include return on equity and leverage as control variables to help ensure that any observed relationship between abnormal returns and industry is not simply a result of differences in financial health between firms in different industries. Price to earnings is included as a control to account for differences in growth prospects between firms in different industries, which may also affect the relationship between industry and abnormal returns. Market capitalization is included to control for the size of the companies. Larger firms may be less affected by ESG incidents due to their resources and diversification, or they could be more affected due to higher exposure.

Since we examine abnormal returns following ESG news incidents we also include ESG scores and reputational risk as control variables. These factors reflect a company's overall ESG performance and reputation which could influence investors' reactions to ESG news. The variable used for reputational risk is the RepRisk reputational Index (RRI). In addition, we control for the change in price of crude oil as it is a significant factor that affects the financial performance and market reactions of specific industries. Finally, since we incorporate events from the period 2010 to 2020 in our analysis, we include a variable controlling for a time trend. Given the growing prominence of ESG news, we anticipate a potential time effect where more recent events experience larger abnormal returns.

Table 2: Regression Variables

Variable	Variable Description
IndustryAerospace and Defense	Aerospace and Defense
IndustryAutomobiles and Parts	Automobiles and parts
IndustryChemicals	Industrial chemical generation
IndustryConstruction	Construction
IndustryFinance, Insurance and Advisory	Finance, Insurance and Advisory
IndustryFood services and Accommodation	Food Services and Accommodation
IndustryGeneral Industrials	General Industries
IndustryHealthcare	Healthcare
IndustryIndustrial Metals	Metal and Mining industries
IndustryMedia	Media
IndustryMining and Metals	Mining and Metals industries
IndustryOil and Gas	Oil, gas, and other Petroleum
IndustryRetail	Retail companies
IndustryTechnology	Technology
IndustryTransportation	Transporting
IndustryUtilities	Utilities
ROE	Return on Equity
ESG	ESG Score
RRI	Reputational risk exposure to ESG issues
marketcapUSD2	Measured by market capitalization, US dollars
Ttrend	Variable controlling for time
Oil	Crude oil price
D2E	Debt to Equity ratio
P/E	Price/Earnings

***Note**: The table presents the explanatory variables used in the regression analysis, which is the industry the firm operates in. Each industry is represented as a dummy in the analysis. The variables below the line are the control variables used in the model, which were selected to decrease the possibility of omitted variables.*

5. Data and Sample Selection

5.1 Data Sources

Firm Data

To gather and construct the data for our study, we employ a systematic approach which involve accessing and utilizing multiple databases and packages. For financial data on American companies, we obtain relevant information from the Center for Research in Security Prices (CRSP) database through the Wharton Research Data Services (WRDS) platform. The data includes daily closing prices and outstanding shares, which are essential inputs for the computation of market capitalization.

For European firms, we use the Yahoo Finance package in Rstudio to retrieve daily stock prices and outstanding shares. Additionally, due to limitations in data availability for some European firms, we supplement this data with market capitalization from Refinitiv Eikon. To obtain the ESG scores, we access the Refinitiv Eikon database and collect the scores based on the year of the event date, ensuring that our analysis incorporates the most relevant information. Refintiv Eikon is also used to retrieve the firm's leverage ratio, the company's return of equity, as well as P/E ratio at the date of their event.

ESG News

The data on ESG incident used in this study is retrieved from RepRisk, a provider of transparency on business conduct risk aimed at promoting responsible corporate behavior and driving positive change. The RepRisk database, known as News Data, includes information on the announcement date of ESG incidents, the issues related to them, as well as their severity, novelty, and source reach (RepRisk, n.d.). The incidents may originate from limited reach sources such as local media, smaller non-profit organizations, regional governments, or social media. Most local, national, and international NGOs as well as state, national, and international governments are examples of sources with medium reach. The high reach sources are the few

truly global media channels (RepRisk, n.d.). RepRisk also gives each incident a score for the incident's novelty, which means the newness of the issue addressed for the company. Firms that have experienced the specific type of incident before in a certain location, are categorized as novelty 1. If the incident in question were new for the particular firm, the event is categorized as novelty 2.

Furthermore, the data distinguishes the incidents based on which UN Global Compact Principle they allegedly breached. Based on that information, the incidents are grouped based on being an environmental, social or governance issue. Most incidents in the data are environmental, social, or accounted for more than one specific type of incident. Very few incidents consisted of only governance issues. The following is an outline of the activities encompassed by the three pillars according to Factset (2022):

Environmental incidents involve various issues that impact ecosystems and landscapes. This includes instances such as contamination of groundwater, forests, rivers, or seas, deforestation, and harm to wildlife. Additionally, the environmental category encompasses concerns regarding global pollution and climate change, local pollution, inefficient use of resources, and improper waste management. Furthermore, it includes the mistreatment of animals through practices like experiments and husbandry.

Social incidents pertain to issues that affect communities. This encompasses matters such as the grabbing of land or water resources, negative impacts on people's livelihoods or employment opportunities, forced relocation of communities, safety concerns, and limited access to life-saving medications. Moreover, the social category addresses human rights abuses and corporate involvement in such abuses, including violence against individuals, human and organ trafficking, privatization of water sources, support for oppressive regimes, and associations with terrorist organizations. It also encompasses issues like inadequate consultation with local communities, social discrimination, child labor, forced labor, occupational health and safety violations, discrimination in employment, poor working conditions, and restrictions on workers' rights.

Governance occurrences cover a wide range of topics involving ethics and governance. This encompasses activities including retaining secret funds, exercising undue influence through lobbying, overcharging, and favoritism, as well as corruption, bribery, extortion, and money laundering. Fraudulent practices, like forgery, deceptive advertising, deceiving investors, or

manipulating stock prices, are also a possibility. These practices can be done for one's own advantage or to hurt others. The governance category also involves tax-related matters, such as tax evasion through illegal means or utilizing tax havens, as well as legal tax optimization strategies. It addresses anti-competitive practices that undermine fair market competition, such as bid rigging, dumping, exclusive dealing, or price fixing. Additionally, it covers issues concerning executive compensation, such as excessive salaries or bonuses, and deceptive communication practices, such as "greenwashing," false advertising, off-label marketing, or "astroturfing."

RepRisk also provides data on the reputational risk of a company, labeled RRI. The RRI is a specialized algorithm developed by the organization that actively measures and assesses a company's exposure to risks associated with ESG factors, and the firm's business conduct. The RRI captures and quantifies the level of media and stakeholder attention a company receives regarding ESG issues. It serves as an indicator of the company's current reputation and to which extent it is scrutinized in relation to ESG matters (RepRisk, n.d.).

5.2 Sample construction

The RepRisk database covers both public and private companies as well as infrastructure projects. Hence, we first sort private companies and infrastructure projects out of the RepRisk data since our focus is solely on public companies. Thereafter, we group the remaining firms based on their location, categorizing them as either European or American firms. To ensure the quality and reliability of our data, we include only severity 3 incidents in our analysis, due to the assumption that minor incidents would not cause significant effects. As a result, we are able to refine our sample size to approximately 550 firms, most of which have experienced multiple incidents.

To retrieve the American stock prices from WRDS we use the ticker symbols from the CRSP database, which provides us with daily closing prices and outstanding shares. To collect the European financial data, we initially attempted to use the Compustat database within WRDS. However, we encountered difficulties using ISIN. Consequently, we changed approach and instead accessed the Yahoo database directly within RStudio. This alternative method proved to be more suitable for obtaining the desired European data. However, due to challenges with data availability we could not collect daily prices for 50 of the European firms, and they were subsequently dropped from the sample.

For our analysis we use the first incident with severity 3 within the time period 2010-2020. As a result, we remove firms that did not encounter severity 3 incidents in the given time period from our sample. Furthermore, we remove additional firms when controlling whether they were listed on the actual event date and if they were listed long enough to estimate the expected return in the estimation window of -200 days. To avoid reversed causality issues and ensure the robustness and accuracy of our findings, we obtain the market capitalization of each firm on the day before the incident. Subsequently, we proceed to convert the market capitalization of European firms into dollars, taking into account the currency of the respective stock indices in which the companies are listed. This conversion is done using the exchange rate applicable on the specific date of the event.

After ensuring all the essential price information for our sample, we acquire the remaining financial, and ESG data necessary for our study. Initially, we gather ESG scores, leverage ratios, ROE, and P/E ratios from the Refinitiv Eikon database for all the companies included in the sample. Furthermore, we employ the RepRisk data source to obtain the Reputation Risk Index (RRI) scores for our selected firms. Each firm is associated with a unique RepRisk ID, which has to be matched within the RepRisk's "company identifier" database. Due to the challenge of obtaining daily values for the selected metrics, all pertinent data, except for the ESG scores, which represent the score of the corresponding year of the event, are collected during the respective month of each individual event date.

In order to assess our second hypothesis of ESG commitment, we manually check whether the sample firms are signatories of the UN Global Compact. We categorize the firm as a signatory if it was a member before the date of its first severity 3 news incident. As a result, we obtain a sample consisting of 99 firms classified as signatories and 230 firms classified as non-signatories.

Using a systematic approach, we collect and compile the dataset for our study, which includes financial data and incident information for publicly listed firms in Europe and the US. The dataset comprises 329 distinct incidents for individual firms, forming the foundation of our analysis. The final sample provides us with the necessary data to derive meaningful insights and testing our hypotheses. Nevertheless, it is important to acknowledge that our final sample are restricted due to different limitations mostly through data unavailability. It is essential to take these limitations into consideration when interpreting the results.

Index selection

The choice of an appropriate benchmark index for the market model is imperative when calculating abnormal returns in an event study. The choice of benchmark index has been debated in literature, where Strong (1992) argues that a value-weighted market index is a valid choice as it captures the relative importance of different stocks in the market. Conversely, Brown and Warner (1980) suggest that an equally weighted index may lead to more powerful tests for detecting abnormal returns, as it avoids overweighting high market capitalization securities. For our thesis, the event study is conducted separately for European firms and American firms, and two different benchmark indices are utilized to obtain reliable results.

For the American sample we incorporate the S&P 500 as the benchmark index. The S&P 500 has multiple advantages over Dow Jones and Nasdaq, as the index provides a comprehensive representation of the US stock market, encompassing a larger number of companies across diverse sectors, Additionally, its value-weighted methodology accurately reflects the relative size and importance of individual companies (Cai and Houge 2007).

Selecting a benchmark index for European firms is challenging due to the firms being from 21 different countries with varying market characteristics. After careful consideration, we are using the EuroStoxx50 index as the shared benchmark for European firms. This index is a strong choice for a benchmark due to its various industries, utilization of a value-weighted methodology, widespread recognition in European markets, and ample availability of historical data.

Sample Statistics

The sample is composed only of listed firms and has a mean market capitalization of 34,17 billion USD, indicating the prevalence of large companies within the sample. In total, the sample encompasses 22 distinct countries. The highest number of ESG incidents occur in the US, which is unsurprising given the country's size and the scale of its economic activities.

Apart from the United States, the distribution of ESG incidents across the countries in our sample is relatively even. Among the European countries, the majority of reported incidents are in the United Kingdom, France, and Germany. ESG ratings vary significantly across the sample, with Russia and Poland scoring notably lower than the other countries. Conversely, Portugal and Austria have the highest ESG scores. However, due to their low incident count in our

sample, it is difficult to draw any conclusions of their ESG performance.

The average P/E ratio in our full sample is 22.15. As illustrated in Table 3, the P/E ratio varies significantly across the different nations. However, it is important to acknowledge that in countries with few incidents, the average value are greatly impacted by companies in that country with high values for the specific variable. In terms of risk exposure, most countries in our sample have a relatively average reputational risk (RRI). Switzerland is an exception, as it reports a remarkably high RRI, indicating that Swiss firms have experienced a high number of ESG incidents in the past. Overall, these findings shed light on the diverse ESG performance and risk exposure of listed firms across the sample countries.

Table 3: Summary Statistics, Full Sample

Country	Market Cap	ESG Score	ROE	RRI	P/E	Leverage Ratio	Number of incidents
Austria	16.20	81.69	0.11	18.00	7.72	0.00	1
Belgium	9.48	40.62	0.10	15.60	30.67	0.22	5
Denmark	9.29	63.05	0.18	15.00	20.13	0.15	3
Estonia	0.45	NaN	0.06	15.00	10.03	0.32	1
Finland	22.12	72.05	0.06	21.40	23.56	0.68	5
France	41.60	68.55	0.08	26.88	22.72	1.63	17
Germany	37.84	70.17	0.13	25.76	23.82	1.72	17
Iceland	0.45	31.00	0.08	28.00	9.97	0.43	1
Ireland	3.28	34.72	0.18	26.50	21.32	0.39	2
Italy	11.41	70.45	0.03	28.50	14.78	1.15	10
Luxembourg	24.09	64.15	0.04	25.00	16.80	0.47	2
Netherlands	37.19	57.82	0.17	18.58	24.06	0.61	12
Norway	22.05	62.62	0.11	24.75	35.62	0.50	4
Poland	1.61	31.78	0.08	21.00	10.44	0.10	2
Portugal	4.65	79.47	0.10	31.00	12.20	0.79	1
Russia	25.08	33.23	0.12	18.50	9.99	0.13	4
Spain	25.17	72.30	0.09	21.25	13.28	0.64	8
Sweden	16.22	68.38	0.15	18.60	14.40	0.71	5
Switzerland	32.05	65.73	0.18	38.67	16.29	0.54	7
Turkey	9.40	70.86	0.12	7.50	14.17	0.13	3
UK	40.27	64.29	0.22	28.85	22.10	0.27	35
USA	46.76	57.50	0.19	26.83	23.39	0.53	184

***Note**: The table above displays the company characteristics across countries. The data shows the average values for each of the 22 countries. The six variables presented are market capitalization, return on equity, ESG rating, and RRI (Reputational Risk Index), price/earnings ratio and leverage ratio. Market capitalization represents the overall value of a company's outstanding shares (US billion dollars). Return on equity measures the profitability of a company by indicating the percentage of net income relative to shareholders' equity. ESG rating measures how well a company performs in terms of the three pillars: environment, social, and governance. The RRI indicates a company's risk exposure. Firms will have a score within 0 to 100, where 0 and 24 indicates low risk, 25-49 indicates medium risk, 50-59 indicates high risk, 60-74 indicates very high risk, and 75-100 indicates extremely high risk. The RRI is a measure that indicates the likelihood of a company experiencing future incidents, and is based on the number of incidents the given firm has experienced in the past.The table also presents the average price-to-earnings ratio, which reflects the valuation of a company's stock price relative to its earnings per share. The company's leverage ratio is also included in the table and measures the company's financial leverage by quantifying the proportion of debt a firm holds in relation to its total equity. In addition, the table displays the number of incidents per country.*

Table 4 displays an overview of the characteristics and their metrics for the different industries in our sample. The initial data from RepRisk, which identifies a large number of industries, are narrowed down to 16 to obtain a concise sample. The most frequent incidents occured in the

financial industry, mining, oil, and the food services and accommodation industry. The table suggests that there is a small difference in market capitalization between firms that have signed the UN Global Compact and those that have not. Moreover, the average ESG rating for signatories tends to be higher, indicating a more pronounced ESG strategy. Shareholder profitability appears to be more prominent for signatory firms for most industries. This may provide a slight indication that members of the UNGC show better financial performance and thus higher return for their shareholders.

We find that industries often associated with negative environmental impact such as oil, mining, and construction, have the highest ESG ratings among the signatories in our sample. Conversely, these same industries feature in the lower half of ESG ratings among non-signatories, which can indicate modest evidence that UNGC signatory firms do indeed strive to improve their ESG performance. On the other hand, it is worth mentioning that companies that were not signatories during the initial severity 3 incident exhibit a slightly lower RRI compared to their peers. These findings may suggest that non-signatory firms actually have a better track record in terms of ESG incidents. This is consistent with some of the criticism of UNGC signatories becoming members to "greenwash" themselves in accordance with Berliner and Prakash (2015). Nevertheless, only 27 percent of the total sample are signatories, which may result in biased average values due to a smaller number of observations.

Another inference we can derive is that signatories tend to have a somewhat higher market capitalization across most of the industries in our sample, suggesting companies that are committed to being more sustainable attract more investments and thus have larger market value. The leverage ratio seems to be higher for signatory firms, which may imply that firms who have signed the UNGC are willing to take on more financial risk. Another explanation can be, that these firms may have access to cheaper debt financing, which is in line with the findings of Lodh (2020). The P/E ratio for both samples are quite mixed, and it is hard to draw any inference for the two samples.

Table 4: Summary Statistics, Signatory Split - Grouped by Industry

Industry	Market Cap	ESG Score	ROE	RRI	P/E	Leverage Ratio	Number of incidents
Aerospace and Defense	16.15	68.93	0.06	21.00	20.37	0.57	1
Automobiles and Parts	61.92	75.81	0.06	39.67	12.70	1.35	3
Chemicals	28.96	56.78	0.54	18.83	19.35	0.63	6
Construction	42.05	71.16	0.10	27.86	32.30	1.53	7
Finance, Insurance and Advisory	39.92	69.54	0.07	28.94	14.69	0.39	18
Food services and accommodation	39.94	64.86	0.18	27.57	27.10	0.74	14
General Industrials	105.48	75.76	0.18	36.00	40.13	1.56	4
Healthcare	133.41	74.62	0.15	39.00	32.45	0.40	5
Mining and Metals	20.80	65.89	0.33	29.80	15.65	0.42	5
Oil and Gas	74.03	79.24	0.14	39.56	15.95	0.76	9
Retail	23.10	65.05	0.25	27.00	36.59	0.86	9
Technology	74.02	64.08	0.13	28.27	20.01	0.85	11
Transportation	92.94	63.16	-0.02	11.50	21.07	3.66	2
Utilities	7.73	66.10	0.10	21.80	17.00	0.68	5

***Note**: The table shows the sample statistics for the firms that had signed the UN Global Compact as of their first incident. The table is grouped by industry and presents the industries in alphabetic order. Industrial metals and media are not represented in the table, as none of the firms included in the signatory sample operated within these sectors. The six variables presented are market capitalization, return on equity, ESG rating, and RRI (Reputational Risk Index), price/earnings ratio and leverage ratio. In addition, the table displays the number of incidents per industry.*

Table 5: Summary Statistics, Non-Signatory Split - Grouped by Industry

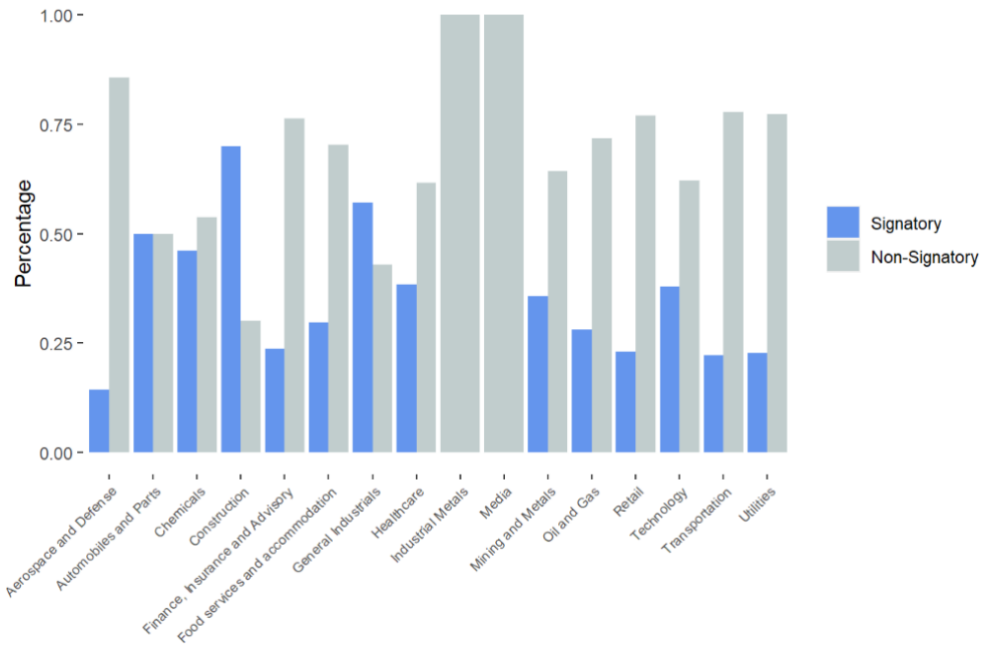
Industry	Market Cap	ESG Score	ROE	RRI	P/E	Leverage Ratio	Number of incidents
Aerospace and Defense	42.70	66.16	0.03	30.67	24.59	11.10	6
Automobiles and Parts	35.00	80.87	0.28	49.33	13.87	2.43	3
Chemicals	28.42	57.75	0.16	13.57	26.23	0.97	7
Construction	17.90	38.56	0.12	21.33	17.85	1.51	3
Finance, Insurance and Advisory	36.40	59.41	0.09	24.50	14.69	0.06	58
Food services and accommodation	20.47	55.60	0.19	22.53	22.55	0.05	33
General Industrials	2.94	62.08	0.19	11.00	17.61	1.03	3
Healthcare	25.83	47.24	0.21	10.12	37.34	1.63	8
Industrial Metals	38.76	61.69	0.10	27.00	20.19	0.22	1
Media	63.43	44.84	0.31	24.00	55.23	0.20	4
Mining and Metals	35.74	67.93	0.29	25.78	15.42	0.51	9
Oil and Gas	48.68	48.14	0.13	28.52	17.04	0.49	23
Retail	35.23	56.40	0.23	29.10	33.27	0.95	30
Technology	67.51	55.74	0.23	26.61	40.36	-2.26	18
Transportation	9.83	52.68	0.13	22.71	19.58	0.19	7
Utilities	9.98	60.38	0.16	20.59	19.82	0.77	17

***Note**: The table shows the sample statistics for the firms that had not signed the UN Global Compact as of their first incident. The table is grouped by industry and presents the industries in alphabetic order. All industries are represented in the table. The six variables presented are market capitalization, return on equity, ESG rating, and RRI (Reputational Risk Index), price/earnings ratio and leverage ratio. In addition, the table displays the number of incidents per industry. The aerospace and defense industry has an unusually high average leverage ratio as a result of Boeing CO's exceptionally high debt to equity ratio at the event date.*

Figure 1 shows a clear majority of non-signatory firms when looking at events between the period of 2010 and 2020. The distribution is influenced by the fact that a considerable number

of observations have their first incident early in the sample period. However, in our analysis, we find a clear trend towards more companies signing the UNGC after 2015. Another contributing factor to the majority of firms not being signatories is the higher number of American companies in our sample, where signing appears to be less prevalent among US firms. Specifically, only 18% of the American firms in our sample were members at the time of their incident, whereas European signatories constitute 43.5% of the European sample. The majority of industries exhibit a greater presence of non-signatory firms compared to signatory firms, the three industries that have the closest match are automobiles and parts, chemicals, and construction. Interestingly, the chemical industry, empirically portrayed to be greatly affected by environmental issues (Capelle-Blancard and Petit, 2019), demonstrates a high level of ESG commitment in our data. The financial industry, despite its substantial public influence, exhibits the lowest number of UNGC signatories in our sample. This finding is somewhat unexpected, considering the industry's significant involvement in promoting sustainable finance and contributing to the green shift.

Figure 1: Distribution of signatories and non-signatories across industries. Full Sample.

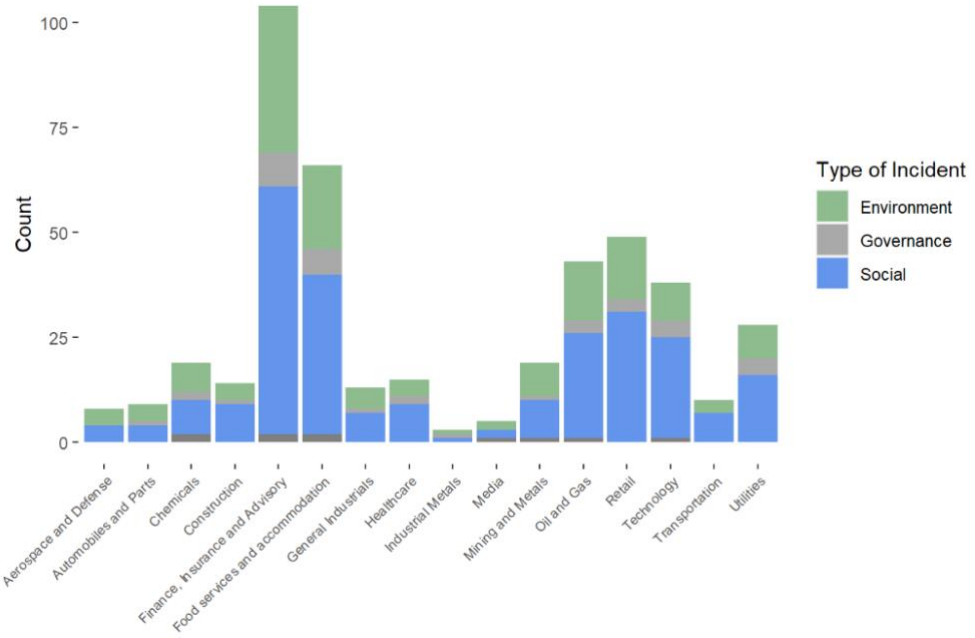


Note: *The figure above illustrates the percentage of firms that have signed and not signed the UN Global Compact as of the individual firm's first severity 3 incident in the period between 2010 to 2020. Blue columns represent signatories, while gray columns represent non-signatories.*

Figures 2 and 3 display the range of ESG incidents that are most commonly observed across various industries in our sample. The data from RepRisk does not specify which ESG pillar the incident falls under, but rather which UNGC principle was violated. All incidents are manually reviewed and categorized based on the violated UN principle. The majority of the incidents

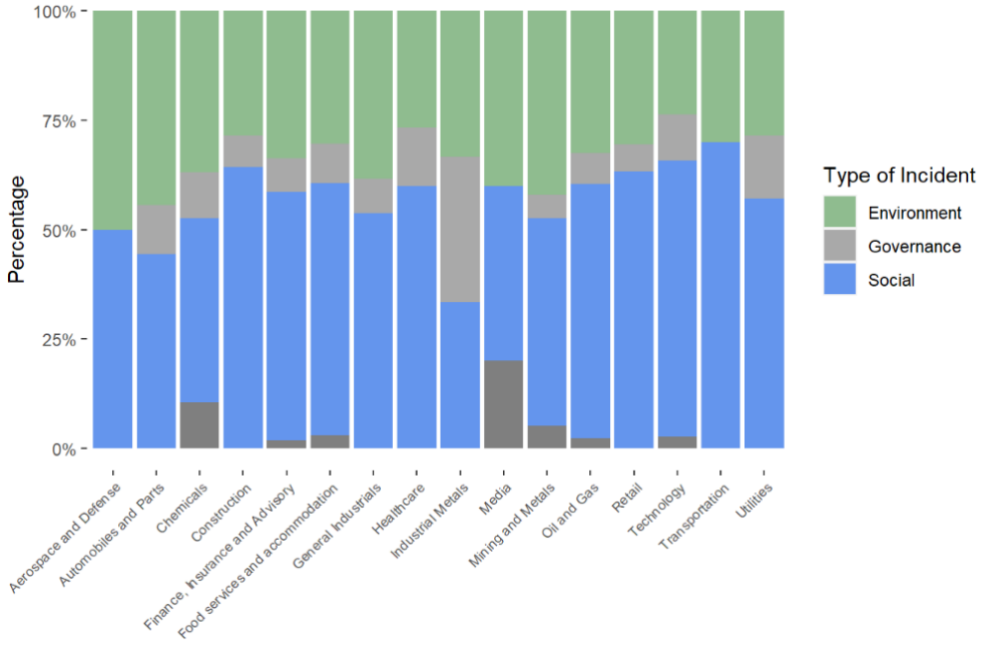
violated the principles related to labor, human rights, and environment, which belong to the social and environmental pillars. Additionally, a smaller number of incidents involve governance issues related to anti-corruption. Several incidents violated multiple principles, resulting in a larger total count than the number of individual incidents. In examining figure 3, we see that social incidents were slightly more prevalent across most industries, indicating their high frequency. For some industries, there are sections in the figure marked as dark gray. This is due to some incidents not displaying any breached UNGC principles in the RepRisk database, thus being classified as NAs.

Figure 2: Distribution of types of incidents across sectors. Full sample.



***Note**: The figure above illustrates the distribution of the different types of incidents on the samples of individual industries in the period between 2010 to 2020. Green represents Environmental incidents, gray indicates governance incidents, whilst the blue columns represent incidents regarding social issues. The dark gray sections visible in certain industries indicate incidents that were included by RepRisk but did not have any specific UNGC principle breached.*

Figure 3: Distribution of type of incident across industries in percentage. Full Sample.



Note: *The figure provides insights into the predominant types of incidents within distinct industries in the period between 2010 to 2020. The green bars correspond to environmental incidents, gray bars indicate governance incidents, and blue bars represent incidents related to social issues. gray sections visible in certain industries indicate incidents that were included by RepRisk but did not have any specific UNGC principle breached.*

Table 6 shows that social incidents are most common, regardless of UNGC membership. Compared to signatory firms, non-signatory companies seem to have more governance incidents. Overall, there seems to be no significant difference in frequency regarding which type of incidents occur for the two samples. We derive two plausible inferences from the table. Firstly, the majority of firms in the sample may not recognize the benefits of signing, leading to a higher percentage of non-signatories. Secondly, signatories may be more aware of the principles and less likely to violate them, resulting in a reduced number of events and exclusion from the original RepRisk statistics.

Table 6: Types of Incidents for Signatories and Non-Signatories

Signatories		
Category	Count	Percentage
Social	79	59.85%
Environment	43	32.58%
Governance	10	7.58%
Non-signatories		
Category	Count	Percentage
Social	174	57.81%
Environment	100	33.22%
Governance	27	8.97%

***Note**: The table above shows the difference in the types of incidents across companies which are participants in the UNGC and not. The count represents the total count of the social, environmental and governance incidents in the respective samples.*

6. Analysis and Discussion

6.1 Event Study

Full Sample

From the event study conducted with the full sample, we find minimal and insignificant negative cumulative average abnormal returns within the different event window intervals, as shown in Table 7. We do not reject the null hypotheses and our results suggest that the abnormal returns following ESG news are not significantly different from zero. Nevertheless, as we investigate the CAR for each company, it appears that a majority of estimates are significantly deviating from zero. Notably, these results vary, with some estimates being significantly lower than zero and others significantly higher. Consequently, when calculating the CAAR for the entire sample, we are unable to reach the conclusion that it is significantly different from zero, given the presence of both positive and negative CAR estimates. The results of our study deviates from some of the earlier research (Capelle-Blancard & Petit 2019; Flammer 2013; Krueger 2015) that discover slightly negative but significant abnormal returns following negative ESG news. However, our findings align with Serafeim (2021) suggesting that the majority of ESG news does not elicit significant reactions from capital markets, indicating that such news is not considered relevant for evaluating a company's value. Additionally, it favors prior research suggesting that reactions to ESG activities are highly context specific, and

reactions being dependent on the materiality of the incident (Schmidt 2019; Serafeim and Yoon 2022).

The magnitude of the CAAR estimates remains relatively consistent across event windows, ranging from approximately -0.00138 to -0.00104. Notably, the event window which encompasses the longest time period [-1, 2] exhibits the most pronounced negative CAAR value, indicating a continued downward trajectory in stock returns. Conversely, event windows that include the immediate period surrounding the incident ([-1, 0], [0, 1]) display similar CAAR values, ranging from approximately -0.00117 to -0.00111. These results suggest that the market swiftly assimilates information regarding ESG incidents into stock prices. Overall, while the observed CAAR values do not reach statistical significance, these findings shed light on the market's reaction to ESG incidents.

Table 7: Cumulative Average Abnormal Return, Full Sample

Event window	CAAR	Standard Errors
[-1, 2]	-0,00138	0,00186
[-1, 1]	-0,00133	0,00159
[0, 2]	-0,00104	0,00172
[-1, 0]	-0,00111	0,00133
[0, 1]	-0,00117	0,00140

Note: *The table shows the result from the event study conducted for the full sample. The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative average abnormal return for the 329 individual events in the middle column. Heteroskedasticity robust standard errors are represented in the right hand column. An estimation window of [-200, -2/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level.*

Signatory Split

To assess our second hypothesis of ESG commitment, we split the sample in signatory and non-signatory firms (Table 8) and detect a difference between the estimated abnormal return. For the UN Global Compact signatories, we find a marginal negative CAAR of 0.5 percent, significant at a 10 percent level. We cannot find any significant abnormal return for non-signatory firms. These results support our hypothesis that companies with higher ESG commitment are penalized more by the capital markets than those with lower ESG commitment. Additionally, our findings support the previous research suggesting that companies with high corporate social performance face harsher penalties in case of negative incidents (Baron and Diermeier 2007; Baron 2009; Servaes and Tamayo 2013). Companies with strong ESG commitment can experience larger negative returns due to being held at a higher standard by

investors and stakeholders. Furthermore, a negative ESG incident may be considered as a significant deviation from expected behavior, or it may be perceived as hypocrisy. A company that promotes itself as responsible should adhere to their stated values consistently, and deviation may therefore cause stronger negative reactions from investors. With the increasing ESG focus, companies with stronger commitment may receive more attention. The reputational damage or higher level of scrutiny can be contributing factors to more prominent reactions. Interestingly, as illustrated in table 4, signatory firms seem to have larger market capitalization which can potentially lead to a stronger market reaction, given the increased coverage and attention received by these firms. This observation aligns with the research of Aouadi and Marsat (2018) and Servaes and Tamayo (2013), advocating for the increased impact on returns for firms subject to high public awareness. Finally, since investors who integrate ESG considerations into their investment strategies are more likely to be invested in companies with high ESG commitment, they may react more strongly when negative news emerges.

Table 8: Cumulative Average Abnormal Return, Signatory Split

	Signatory		*Non-signatory*	
Event window	**CAAR**	**Standard Errors**	**CAAR**	**Standard Errors**
[-1, 2]	-0.00514*	0.00295	0.00023	0.00235
[0, 1]	-0.00212	0.00218	-0.00076	0.00178

Note: *The table above shows the result from the event study conducted when splitting the sample depending on participation in the UN Global Compact. The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative abnormal average return for the 329 individual events. Heteroskedasticity robust standard errors are represented in the right hand column within the sample split. An estimation window of [-200, -2/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level.*

Media Source Split

Next, we examine whether there is a difference in impact on abnormal returns of news incidents reported by media sources of limited, medium, and high reach (Table 9). We find no evidence to support our third hypothesis suggesting that news incidents reported by high reach media sources result in larger negative abnormal returns. Our findings indicate that the nature of media sources has little influence on investor reaction, which is consistent with the efficient market hypothesis (Fama, 1970). However, these results do not show any evidence supporting the previous research suggesting that more public visibility causes larger effects (Aouadi and Marsat 2018; Fang and Peress 2008; Servaes and Tamayo 2013). Conversely, we find the most significant and negative effect on abnormal returns for companies reported by the limited reach source. A possible explanation for this effect is that smaller firms tend to have less media coverage, and shares of smaller firms are less liquid which in turn may cause a larger negative

reaction among investors. We observe a large discrepancy in the number of observations within the media source groups, where our sample size for source 3 is very limited. Consequently, there is a greater risk of confounding events biasing the results in the small sample group.

Table 9: Cumulative Average Abnormal Return, Source Split

	Source 1		*Source 2*		*Source 3*	
Event window	**CAAR**	**SE**	**CAAR**	**SE**	**CAAR**	**SE**
[-1, 2]	-0.00213	0.00279	-0.00055	0.00267	-0,00136	0,00708
[0, 1]	-0.00374*	0.00212	0.00106	0.00201	0,00262	0,00462

Note: *The table above shows the result from the event study conducted when splitting the sample depending on limited, medium, and high reach (source). The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative abnormal average return for the 329 individual events. Heteroskedasticity robust standard errors are represented in the right hand column within the sample split. An estimation window of [-200, -2/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level.*

Novelty Split

For our final event study (Table 10) we split the sample based on the novelty of the incidents to assess our fourth hypothesis. We expect firms that have experienced the same type of incident before to encounter larger negative abnormal returns. Firms that have experienced the specific type of incident before, are categorized as novelty 1. If the incident in question were new for the particular firm, the event is categorized as novelty 2. Our results show negative abnormal returns for firms experiencing incidents categorized as novelty 2 in the event window [0, 1], significant at a 10 percent level. A possible explanation can be that investors may perceive a new incident as a signal of the company's inability to manage risks or prevent incidents, which may cause a larger negative reaction. Additionally, a new incident may receive more media attention, amplifying negative reactions. Furthermore, it is more unexpected than a recurring incident, which is consistent with Serafeim and Yoon's (2022) findings of larger market reactions from unexpected news. Conversely, it deviates from the research suggesting that firms experiencing recurring negative ESG incidents elicit larger reactions following negative ESG news (Derrien et al. 2022; Glossner 2021; Teng and Yang 2021)

The CAAR for recurring incidents do not yield any significant negative values, in fact we find that on average they yield non-significant positive estimates. Recurring incidents may signal ongoing issues and result in smaller negative reactions from investors. An explanation may be that a firm's incident history encompasses material ESG information that can serve as an indicator of potential negative returns. The market may already take into account the risk associated with such incidents, indicating that the potential for incidents recurring can already be reflected in the stock price. This notion is consistent with Glossner (2021) who finds

evidence of the market often underreacting to ESG news.

Table 10: Cumulative Average Abnormal Return, Novelty Split

	Novelty 1		*Novelty 2*	
Event window	**CAAR**	**Standard Errors**	**CAAR**	**Standard Errors**
[-1, 2]	0.00063	0.00305	-0.00238	0.00235
[0, 1]	0.00308	0.00219	-0.00328*	0.00178

Note: *The table above displays the findings of the event study conducted by dividing the sample based on whether the incident is new or a recurring event. The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative abnormal average return for the 329 individual events. Heteroskedasticity robust standard errors are represented in the right hand column within the sample split. An estimation window of [-200, -2/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level.*

6.2 Regression Analysis

In the cross-sectional regression, we examine whether the industry and type of news impact abnormal returns. We perform three regressions, one with the full sample, one for social incidents and finally one for environmental incidents. To address omitted variable bias, we include control variables we anticipate would be correlated with industry and returns. We run the regressions for the abnormal returns with the event window [-1,2] and multiple intervals within the full event window.

From the estimates in the full sample regression (Table 11), we find that most of the industry coefficients are positive while the control variables have negative effects. We do not draw any inference from the control variables considering that there are likely omitted variables correlated with them as well as the CARs. However, the effect on CAR is significant in mining, retail, and the aerospace and defense industry within multiple intervals of the full event window. These estimates may suggest that investors do not react as negatively to ESG news in these industries.

Companies within these industries may have established a certain level of resilience towards negative ESG incidents due to various factors such as their business models, customer loyalty or market demand. They may have implemented robust ESG policies, demonstrating their commitment to sustainability and responsible business practices, which in turn may help mitigate the impact of negative news. For instance, companies in the retail industry often experience consumer spending patterns that can remain relatively stable despite negative news due to brand loyalty and customer trust. Moreover, the mining industry is largely driven by the

demand for natural resources, which can remain relatively high even in the event of negative news. Moreover, long term horizons for returns on investments are typical, which can contribute to a more tempered market reaction to short term negative news. Similar for the aerospace and defense industry are long term projects and contracts. The industry often relies on government contracts which creates a stable source of revenue, and the stability and continuity of these companies are often prioritized by national security.

Table 11: Regression Results Full Sample

Regression Results Full Sample					
	Dependent variable:				
	[-1:2] CAR	[-1:1] CAR	[0:2] CAR	[-1:0] CAR	[0:1] CAR
	(1)	(2)	(3)	(4)	(5)
IndustryAerospace and Defense	0.033*	0.034**	0.018	0.029**	0.020
	(0.019)	(0.017)	(0.018)	(0.013)	(0.015)
IndustryMining and Metals	0.040**	0.035**	0.029*	0.024*	0.022
	(0.018)	(0.016)	(0.017)	(0.013)	(0.014)
IndustryAutomobiles and Parts	0.001	0.016	-0.016	0.024*	0.005
	(0.020)	(0.018)	(0.019)	(0.014)	(0.016)
IndustryChemicals	0.027	0.027*	0.017	0.026**	0.015
	(0.018)	(0.016)	(0.017)	(0.013)	(0.014)
IndustryConstruction	0.012	0.012	-0.001	0.022*	-0.001
	(0.019)	(0.016)	(0.018)	(0.013)	(0.015)
IndustryFinance, Insurance and Advisory	0.020	0.019	0.007	0.018*	0.006
	(0.016)	(0.013)	(0.014)	(0.011)	(0.012)
IndustryFood services and accommodation	0.016	0.020	0.009	0.014	0.012
	(0.015)	(0.013)	(0.014)	(0.011)	(0.012)
IndustryGeneral Industrials	0.009	0.009	-0.001	0.005	-0.003
	(0.020)	(0.017)	(0.019)	(0.014)	(0.015)
IndustryHealthcare	0.012	0.008	0.001	0.007	-0.002
	(0.018)	(0.016)	(0.016)	(0.012)	(0.014)
IndustryIndustrial Metals	0.028	0.028	0.015	0.028	0.015
	(0.036)	(0.031)	(0.033)	(0.025)	(0.027)
IndustryMedia	0.025	0.029	0.011	0.005	0.021
	(0.025)	(0.022)	(0.023)	(0.018)	(0.019)
IndustryOil and Gas	0.020	0.025*	0.004	0.015	0.010
	(0.016)	(0.014)	(0.015)	(0.011)	(0.012)
IndustryRetail	0.029*	0.024*	0.014	0.022*	0.011
	(0.017)	(0.014)	(0.015)	(0.012)	(0.013)
IndustryTechnology	0.026	0.023*	0.016	0.017	0.013
	(0.016)	(0.014)	(0.015)	(0.011)	(0.012)
IndustryTransportation	0.018	0.023	0.005	0.017	0.011
	(0.020)	(0.018)	(0.019)	(0.014)	(0.016)
IndustryUtilities	0.027*	0.023	0.020	0.017	0.015
	(0.016)	(0.014)	(0.015)	(0.011)	(0.012)

ROE	-0.008	-0.008	-0.007	-0.004	-0.007
	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)
ESG	0.00001	0.0001	-0.00001	0.0001	0.00004
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
RRI	-0.0002	-0.0001	-0.0002	-0.0002*	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
marketcap_USD2	0.0001**	0.00005	0.0001**	0.0001*	0.00005
	(0.00004)	(0.00004)	(0.00004)	(0.00003)	(0.00003)
Ttrend	-0.001	-0.002**	-0.0004	-0.002**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Oil	-0.0002	-0.0002	-0.0001	-0.0002*	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Debt_Ratio	-0.0005	-0.0005	-0.0003	-0.0003	-0.0004
	(0.0004)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
`P/E`	-0.0001	-0.0001	-0.0001	0.00001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	286	286	286	286	286
R^2	0.086	0.085	0.093	0.087	0.079
Adjusted R^2	0.002	0.001	0.010	0.003	-0.005
Residual Std. Error (df = 262)	0.033	0.029	0.030	0.023	0.025
F Statistic (df = 24; 262)	1.029	1.008	1.119	1.034	0.936
Note:					*p<0.1; **p<0.05; ***p<0.01

Note: The regression table illustrates the industry effect on cumulative average abnormal returns from the various event windows in our event study. The removal of intercept allows us to infer the impact of each industry dummy variable in relation to a baseline of zero. The quantitative control variables used in the model are the following: Return on equity, ESG score, RRI (Reputational risk index), market capitalization in US dollars, variable controlling for time (Ttrend), oil price, leverage ratio and lastly, price to earnings ratio. Each column/model represents a different event window starting in the first column with the longest window [-1, 2] thereafter, [-1, 1], [0, 2], [-1, 0] and [0, 1]. Coefficients marked with ***, **, and * indicate significance levels of 1%, 5%, and 10% respectively. It is important to note that the table includes 286 observations due to one or more missing values of control variables for certain firms.

For incidents concerning social issues (Table 12), we initially expect to see more pronounced negative effects within industries frequently criticized for inadequate working conditions or supply chain problems, like the apparel industry. We also anticipate negative effects in the food and accommodation industry due to concerns about food safety or labor exploitation. Furthermore, in the technology industry regarding privacy breaches and data misuse, and the healthcare industry concerning unethical marketing practices, drug pricing controversies, or healthcare accessibility. However, we discover positive coefficients for the majority of industries.

Analyzing abnormal returns in the interval [0, 1], we find significant positive effects of negative news concerning social issues in the mining and metals industry, chemicals, food and accommodation, and the technology industry. Reasons for positive coefficients can be that companies in these industries are well diversified, and news concerning social incidents

affecting one aspect of their business does not necessarily harm their overall financial performance. Companies may also be more transparent in their ESG practices, making it easier for investors to assess their performance and react accordingly to negative news. There may be industry-specific factors mitigating the impact of negative news. For instance, contracts not affected by social concerns in the mining industry, or high growth potential in technology businesses that outweigh news of social incidents in the short term. Investor perception of these industries may also be the reason for less severe reaction to negative news. Controversy to our initial assumption, the food and accommodation industry may be perceived as actively addressing social concerns and implementing responsible practices, and thus be less prone to news of social incidents. Furthermore, the technology industry is often associated with a higher risk tolerance, and with innovation and advancements that can have positive social impacts. This positive perception may buffer the negative impact of news and lead to a more favorable market reaction.

When analyzing negative news concerning environmental issues (Table 12), we expect the impact on returns to be more negative in industries often faced with criticism due to emissions, resource depletion and pollution such as the oil industry, chemical production, transportation, and the automotive industry. From our analysis, we find significant negative coefficient estimates for most industries following negative environmental news.

As expected, the results show the largest negative impact in heavy manufacturing industries with large-scale production processes and resource consumption such as the automotive industry, chemical production, and the transportation industry. These findings suggest that the companies in these industries experience more negative abnormal returns compared to the industry average following negative news. These results are consistent with Capelle-Blancard and Petit (2019) who also find that environmental issues cause the largest impact for the chemical industry. The prominent negative impact in these industries can be because of high sensitivity to environmental concerns due to significant environmental impact. These industries are also subject to stringent environmental regulations, and concerns about compliance and possible legal consequences may lead to a more negative market reaction. Additionally, incidents and violations can lead to substantial financial liabilities in these industries, such as fines, penalties, and cleanup costs. The anticipation of these potential financial costs may impact stock performance. Moreover, reasons for not finding as prominent negative effects in the oil industry as expected, may arise from the industry being a well-established sector. Market

reactions may be less severe due to the industry's high resilience from already weathering numerous challenges and controversies over the years.

Furthermore, we find a large negative effect in the financial industry. The financial industry's negative impact following negative environmental news can be attributed to its reliance on public trust and reputation, which can be tarnished if it is associated with harmful activities or fails to address risks. Additionally, financial institutions are expected to integrate environmental considerations into their operations and investment decisions as well as being object to strict regulatory oversight. Negative environmental news can cause concerns about compliance with environmental regulations and sustainability standards, which in turn can have a negative impact on returns. Finally, the smallest negative but significant effect is in the Retail industry. It is marginally smaller but may be because of lower direct environmental impact of primarily focusing on the sale of products rather than the production process.

To summarize, our findings suggest that there overall is no significant negative impact of industry following negative ESG news, but rather a positive effect in mining, retail, and the aerospace and defense industry. Similarly, our analysis of incidents concerning social incidents does not find any evidence suggesting any negative effects, but rather a positive effect in the mining industry, chemicals, food and accommodation, and the technology industry. However, for news incidents related to environmental issues, we detect a significant negative effect for several industries, with the largest effects in the automotive industry, chemical production, transportation, and the financial industry. A key takeaway from our regression analyses is that companies, especially in heavy manufacturing industries, tend to face more pronounced negative abnormal returns following negative environmental news incidents. It is therefore prudent for management to be proactive in their efforts to address environmental risk, prevent incidents, and manage potential consequences if they should occur.

Table 12: Regression Results, Type of Incident Split

Regression Results: Type Of Incident Split

	Dependent variable:					
	Social [-1:2] (1)	Social [-1:1] (2)	Social [0:1] (3)	Environment [-1:2] (4)	Environment [-1:1] (5)	Environment [0:1] (6)
IndustryAerospace and Defense	0.023	0.023	0.019	-0.063	-0.077	-0.069
	(0.028)	(0.021)	(0.020)	(0.063)	(0.056)	(0.047)
IndustryAutomobiles and Parts	-0.009	0.024	0.019	-0.113*	-0.127**	-0.110**
	(0.032)	(0.025)	(0.023)	(0.062)	(0.055)	(0.046)
IndustryChemicals	0.063**	0.059***	0.056***	-0.173**	-0.178***	-0.162***
	(0.027)	(0.021)	(0.020)	(0.065)	(0.057)	(0.048)
IndustryConstruction	0.019	0.012	0.012	-0.085	-0.112	-0.105*
	(0.027)	(0.021)	(0.020)	(0.080)	(0.071)	(0.059)
IndustryFinance, Insurance and Advisory	0.045*	0.033*	0.031*	-0.108	-0.124**	-0.120**
	(0.024)	(0.018)	(0.018)	(0.064)	(0.057)	(0.047)
IndustryFood services and accommodation	0.043*	0.035**	0.035**	-0.089	-0.112**	-0.107**
	(0.022)	(0.017)	(0.016)	(0.060)	(0.053)	(0.044)
IndustryGeneral Industrials	0.045	0.035	0.034			
	(0.033)	(0.026)	(0.025)			
IndustryHealthcare	0.045	0.027	0.031	-0.116	-0.138**	-0.128**
	(0.027)	(0.021)	(0.020)	(0.073)	(0.065)	(0.054)
IndustryMedia	0.070*	0.055*	0.057**			
	(0.036)	(0.028)	(0.026)			
IndustryMining and Metals	0.063**	0.053**	0.048**	-0.075	-0.090	-0.087*
	(0.028)	(0.021)	(0.020)	(0.064)	(0.057)	(0.047)
IndustryOil and Gas	0.046**	0.042**	0.031*	-0.103	-0.114*	-0.108*
	(0.023)	(0.018)	(0.017)	(0.070)	(0.062)	(0.052)
IndustryRetail	0.049**	0.030	0.028	-0.107	-0.117*	-0.118**
	(0.024)	(0.018)	(0.018)	(0.069)	(0.061)	(0.051)
IndustryTechnology	0.051**	0.035*	0.033*	-0.091	-0.099	-0.102*
	(0.023)	(0.018)	(0.017)	(0.068)	(0.061)	(0.050)
IndustryTransportation	0.034	0.034	0.037*	-0.104	-0.130*	-0.137**
	(0.027)	(0.021)	(0.020)	(0.079)	(0.070)	(0.058)
IndustryUtilities	0.037	0.027	0.030*	-0.067	-0.093	-0.086*
	(0.022)	(0.017)	(0.017)	(0.063)	(0.056)	(0.047)
ROE	-0.017	-0.009	-0.011	-0.027	-0.034	-0.030
	(0.012)	(0.009)	(0.009)	(0.034)	(0.030)	(0.025)
ESG	-0.0001	-0.00001	-0.0001	0.001	0.001**	0.001**
	(0.0002)	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.0003)
RRI	-0.0004**	-0.0002	-0.0002	0.0002	-0.0001	0.0003
	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.0004)
marketcap_USD2	0.0001	0.00002	0.00003	-0.00003	-0.00005	-0.0002
	(0.0001)	(0.00004)	(0.00004)	(0.0002)	(0.0002)	(0.0002)
Ttrend	-0.001	-0.002**	-0.001	0.004	0.004	0.004
	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)	(0.003)
Oil	-0.0002	-0.0001	-0.0001	0.001	0.001*	0.001**
	(0.0002)	(0.0001)	(0.0001)	(0.0005)	(0.0004)	(0.0004)
Debt_Ratio	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
`P/E`	-0.0003*	-0.0002*	-0.0003**	0.0001	-0.00001	-0.0001
	(0.0002)	(0.0001)	(0.0001)	(0.0005)	(0.0004)	(0.0003)
Observations	138	138	138	40	40	40
R^2	0.220	0.236	0.197	0.458	0.518	0.591
Adjusted R^2	0.064	0.083	0.037	-0.142	-0.015	0.138
Residual Std. Error	0.033 (df = 115)	0.025 (df = 115)	0.024 (df = 115)	0.036 (df = 19)	0.032 (df = 19)	0.027 (df = 19)
F Statistic	1.408 (df = 23; 115)	1.546* (df = 23; 115)	1.229 (df = 23; 115)	0.764 (df = 21; 19)	0.972 (df = 21; 19)	1.306 (df = 21; 19)

Note: *p<0.1; **p<0.05; ***p<0.01

Note: The regression table illustrates the industry effect on cumulative average abnormal returns from the various event windows in our event study. The first three models estimate the effect from social incidents, whilst the three last models present the result from environmental incidents. The small number of governance incidents prohibited us from being able to draw any inference and is therefore not included in the table. Incidents concerning two or more types of ESG concerns were not included as we would not be able to draw concrete inference based on the types of incidents The removal of the intercept allows us to infer the impact of each industry dummy variable in relation to a baseline of zero. The quantitative control variables used in the model are the following: Return on equity, ESG score, RRI (Reputational risk index), market capitalization in US dollars, variable controlling for time (Ttrend), oil price, leverage ratio and lastly, price to earnings ratio. Each column represents a different event window starting in the first column with the longest window [-1, 2] thereafter, [-1, and [0, 1]. Coefficients marked with ***, **, and * indicate significance levels of 1%, 5%, and 10% respectively. It is important to note that the table includes 286 observations due to missing values of control variables for certain firms. Industrial metals and media industries are excluded from models 4-6 due to the absence of reported environmental incidents within those sectors during the sample period.

Robustness Check

To ensure the robustness of our results, we use small event windows where calculate abnormal returns from only -1 day before the event and 2 days after. In addition, we check several different intervals within this event window when conducting our event studies with the different splits. When using small event windows, we limit the possibility of confounding events influencing our estimates.

In the process of conducting an event study involving time series analysis, it is essential to address the potential presence of heteroskedasticity in the residuals. Despite using firm specific events, we comprehensively evaluate this issue. We initially employ a graphical examination utilizing a scale-location plot, which facilitates a visual assessment of heteroskedastic patterns. As we observe indications of heteroskedasticity among certain firms, we perform a Breusch-Pagan test for all events. The results show that 40 firms rejected the test, indicating the likely presence of heteroskedasticity in the residual for these companies. Heteroskedasticity in the residuals poses a significant concern for obtaining reliable and accurate results in event studies. This phenomenon entails the unequal distribution of variances in the error terms, violating the assumption of homoscedasticity. Therefore, to ensure the robustness of our estimates we use heteroskedasticity robust standard errors.

In the event study we use the Eurostoxx50 as the benchmark index when calculating the market model across 21 different European countries. We recognize the inherent uncertainty associated with relying solely on one index in such a diverse context. The findings consistently reveal a negative trend, resulting in a negative cumulative average abnormal return when using Eurostoxx50. When comparing the CAAR using the MSCI world index, we observe a more negative overall effect. However, the estimates are not statistically significant. Similarly, the utilization of the Eurostoxx50 do not yield statistically significant results for the European

sample. Moreover, it is worth highlighting that the Eurostoxx50 exhibit a better fit when considering the R-squared analysis (Appendix 3), and the standard error remain relatively stable. Therefore, based on our analysis, we can conclude that incorporating the Eurostoxx50 index does not compromise the robustness of our study.

Table 13: Cumulative Average Abnormal Return, European Sample, Eurostoxx50 vs MSCI

	Eurostoxx50		*MSCI*	
Event window	**CAAR**	**Standard Errors**	**CAAR**	**Standard Errors**
[-1, 2]	-0.00139	0.00303	-0.00125	0.00352
[-1, 1]	-0.00071	0.00244	-0.00287	0.00299
[0, 2]	-0.00175	0.00284	-0.00180	0.00331
[-1, 0]	0.0088	0.00202	-0.00130	0.00240
[0, 1]	-0.00105	0.00219	-0.00253	0.00255

Note: *The table above displays the findings of the event study conducted using the two different indices when calculating the market model for the European sample. The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative abnormal average return for the 329 individual events. Heteroskedasticity robust standard errors are represented in the right hand column within the two indices. The columns 2-3 represent values using Eurostoxx50, while columns 4-5 represent values using MSCI World Index. An estimation window of [-200, -2/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level*

A central hypothesis in our study examines whether the market penalizes firms for their green commitment. Consequently, we want to investigate if there are substantial alterations in the results of the event study when the MSCI world index are employed as the benchmark index for the European sample in the market model. Upon analyzing the data presented in table 14, we observe that the choice of index marginally impacts the results. However, when using the MSCI, we lack statistical significance to assert that UNGC signatory firms are subject to greater impact than non-signatory firms, as we conclude using the Eurostoxx50. Nevertheless, it is essential to note that the disparity in the CAAR values is marginal, and we believe that this discrepancy does not undermine the robustness of our study.

Table 14: Cumulative Average Abnormal Return, Signatories Split, MSCI Index

	Signatory		*Non-signatory*	
Event window	**CAAR**	**Standard Errors**	**CAAR**	**Standard Errors**
[-1, 2]	-0.00414	0.00312	-0.00010	0.00256
[0, 1]	-0.00154	0.00239	-0.00194	0.00191

Note: *The table above shows the result from the event study conducted when splitting the sample depending on participation in the UN Global Compact for the full sample incorporating the MSCI index for the European firms. The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative abnormal average return for the 329 individual events. Heteroskedasticity robust standard errors are represented in the right hand column within the sample split. An estimation window of [-200, -2/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level.*

Furthermore, we recognize the potential influence of confounding events when utilizing a large estimation window of [-200, -2]. To address this concern and enhance the robustness of our

findings, we perform an event study where we employ a reduced estimation window of [-100, -2]. Despite the initial lack of statistical significance, we want to examine whether the modified estimation window would yield changes in the CAAR. Upon analyzing the data presented in table 15, we observe that the values remain relatively consistent, indicating that the revised estimation window do not have a significant impact on the results. This finding provides confidence in the robustness of our initial test, as the reduced estimation window do not introduce substantial difference in the CAAR.

Table 15: Cumulative Average Abnormal Return, Full Sample, New Estimation Window

Event window	CAAR	Standard Errors
[-1, 2]	-0,00112	0,00184
[-1, 1]	-0,00174	0,00151
[0, 2]	-0,00095	0,00171
[-1, 0]	-0,00165	0,00124
[0, 1]	-0,00203	0,00151

Note: *The table above shows the result from the event study conducted when incorporating a shorter estimation window when calculating the market model for the individual firms. The first column presents the event window used, and can be interpreted as [Start, End]. The table displays the cumulative abnormal average return for the 329 individual events. Heteroskedasticity robust standard errors are represented in the right hand column. An estimation window of [-100, -3/-1] was used in the study. ***Denotes the significance of CAAR at the 1% level, **at the 5% level and *at the 10% level.*

7. Limitations and Further Research

The event study methodology addresses only short term stock market reactions which is a limitation of the analysis of the ESG effect on firm value. Further research can be to study whether ESG activities affect firm performance and shareholder value in the long run. To examine this effect, one might regress long-run measures of firm value, for instance Tobin's Q and firm performance on return on assets or net profit margin. However, this approach is challenging since ESG activities are probably endogenous in terms of firm value and firm performance. Taking on this challenge opens an intriguing area of future research.

The final sample size we use in our study are restricted by limitations in data availability and other factors, which should be taken into consideration when interpreting findings. For our third hypothesis we, consistent with prior studies, expected to find a greater effect for companies prone to high media exposure, but conversely observe the opposite. The data limitations and

large difference in number of observations in the samples pose a challenge for inference. It would be interesting to explore the influence of media in greater depth with more comprehensive and specific data.

Furthermore, concerning our fifth hypothesis, we assume the importance of ESG news varies depending on the nature of a company's activities. Another approach for further research could be to include a variable indicating when the news event is considered as a "main concern" for the company, as Serafeim and Yoon (2022) examine materiality.

Finally, it is important to acknowledge the limitations associated with the utilization of daily returns, as it inherently disregards intraday fluctuations and could thus fail to capture the most immediate price reactions. It is essential to recognize that our model solely focuses on examining the impact of news media on stock prices, thereby potentially omitting other explanations and confounding events that may influence the observed outcomes.

8. Conclusion

The focus on sustainable finance has grown rapidly and companies, investors and funds increasingly integrate environmental, social and governance aspects into their business models and investment approaches. However, the effect on financial performance and market returns are still fragmented. Our thesis adds to the current body of literature by focusing on short term market returns following firm specific ESG incidents, and investigating the mechanisms and rationales behind the market's reaction to such news.

From the event study examining the full sample, we do not find significant abnormal returns. However, when splitting the sample based on ESG commitment, we find a significant negative abnormal return for the companies with high ESG commitment. Furthermore, our analysis reveals a marginally significant negative effect for ESG incidents that were novel for individual firms, as well as incidents that were covered by low reach media sources.

The results from the regression analysis indicate that there is a significant and negative industry effect when the news is related to environmental issues. We find the largest negative impact in the chemical production, automotive, transportation, and the financial industry. We do not find

evidence suggesting there are any negative industry effects when the news incident are related to social issues.

Our findings indicate a marginal negative impact of ESG news for companies with higher ESG commitment. However, regarding our general research question, we cannot find evidence suggesting that negative firm specific ESG news has a significant negative effect on a public company's market value in the short term. This does not imply that ESG activities have no impact on firm value at all, but rather highlights the need for further research to explore this relationship. Exploring the long term perspective would be of interest, as there is an increasing body of research supporting the incorporation of ESG considerations to reduce risk, lower costs and enhance long term profitability.

References

Aouadi, A., & Marsat, S. (2018). Do ESG Controversies Matter for Firm Value? Evidence from International Data. *Journal of Business Ethics*, *151*, 1027-1047. https://doi.org/10.1007/s10551-016-3213-8

Baron, D. P. (2009). A Positive Theory of Moral Management, Social Pressure, and Corporate Social Performance. *Journal of Economics & Management Strategy*, *18*(1), 7-43. https://doi.org/10.1111/j.1530-9134.2009.00206.x

Baron, D. P., & Diermeier, D. (2007, July 26). Strategic Activism and Nonmarket Strategy. *Journal of Economics & Management Strategy*, *16*(3), 539-792. https://onlinelibrary.wiley.com/doi/10.1111/j.1530-9134.2007.00152.x

Berg, F., Kölbel, J., & Rigobon, R. (2019). Aggregate Confusion: The Divergence of ESG Ratings. *Forthcoming Review of Finance*. http://dx.doi.org/10.2139/ssrn.3438533

Berliner, D., & Prakash, A. (2015). "Bluewashing" the Firm? Voluntary Regulations, Program Design, and Member Compliance with the United Nations Global Compact. The Policy Studies Journal, 43(1), 115-138. https://doi.org/10.1111/psj.12085

Binder, J. J. (1997). *The Event Study Methodology Since 1969*. SSRN. https://ssrn.com/abstract=41180

Boffo, R., & Patalano, R. (2020, September 26). *ESG Investing: Practices, Progress and Challenges*. OECD. Retrieved April 12, 2023, from https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf

Brown, S. J., & Warner, J. B. (1980). Measuring security price performance. *Journal of Financial Economics*, *8*(3), 205-258.

Burkinshaw, A., & Hannay, J. (2023, February 22). ESG regulation in 2023: Everything you need to know. *Sustainable Future News*. https://sustainablefuturenews.com/policy/2023-guide-to-esg-regulation/#taxonomy

Cahan, S. F., Chen, C., Chen, L., & Nguyen, N. H. (2015). Corporate social responsibility and media coverage. *Journal of Banking & Finance*, *59*, 409-422. https://doi.org/10.1016/j.jbankfin.2015.07.004

Cai, J., & Houge, T. (2007). *Index Rebalancing and Long-Term Portfolio Performance*. SSRN. http://dx.doi.org/10.2139/ssrn.970839

Capelle-Blancard, G., & Petit, A. (2019). Every Little Helps? ESG News and Stock Market Reaction. *Journal of Business Ethics*, *157*(2), 543-565. http://www.jstor.org/stable/45181015

Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and Sustainability Reporting: Economic Analysis and Literature Review. *European Corporate Governance Institute - Finance*, *Working Paper No. 623/2019*. http://dx.doi.org/10.2139/ssrn.3427748

De La O, R., & Myers, S. (2021). Subjective Cash Flow and Discount Rate Expectations. *The Journal of Finance*.

Derrien, F., Krueger, P., Landier, A., & Yao, T. (2022). ESG News, Future Cash Flows, and Firm Value. *Swiss Finance Institute Research Paper*, *No. 21-84*, 72 pages. http://dx.doi.org/10.2139/ssrn.3903274

Dunn, J., Fitzgibbons, S., & Pomorski, L. (2018). Assessing risk through environmental, social and governance exposures. *ournal of Investment Management*, *16*(1), 4-17.

Factset. (2022, July). *AT A GLANCE: REPRISK DATA FEED*. Retrieved May 23, 2023, from https://insight.factset.com/resources/at-a-glance-reprisk-data-feed?fbclid=IwAR0JD2VF07wGFCMrQajYjJ1mKI3g3wunoI9cnO10Eb8rFq0tQwXnv6fEwok

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383–417. https://doi.org/10.2307/2325486

Fang, L. H., & Peress, J. (2009). Media Coverage and the Cross-Section of Stock Returns. *The Journal of Finance*, *64*(5), 2023-2052. https://ssrn.com/abstract=971202 or http://dx.doi.org/10.2139/ssrn.971202

Flammer, C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *Academy of Management Journal*, *56*, 758-781. http://www.jstor.org/stable/43589942

Frank, R. H. (2003). *What price the moral high ground? How to succeed without selling your soul.* Princeton University Press.

Freeman, R.E. (1984). *Strategic management: A stake- holder approach*. Boston: Pit.

Friede, G., Busch, T., & Bassen, A. (2015, October 22). ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies. *Journal of Sustainable Finance & Investment*, *5*(4), 210-233. https://ssrn.com/abstract=2699610

Friedman, M. (1970, September 13). A Friedman doctrine-- The Social Responsibility Of Business Is to Increase Its Profits (Published 1970). *The New York Times*. https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

Getz, D. (2019). *Event Studies: Theory, Research and Policy for Planned Events* (2nd ed.).

Glossner, S. (2021). Repeat Offenders: ESG Incident Recidivism and Investor Underreaction. *SSRN*. http://dx.doi.org/10.2139/ssrn.3004689

Griffin, J., & Mahon, J. F. (1997). The Corporate Social Performance and Corporate Financial Performance Debate: Twenty-Five Years of Incomparable Research. *Business & Society*, *36*(5), 5-31. https://ssrn.com/abstract=2267176

Jørgensen, S., & Pedersen, L. J. T. (2018). *RESTART Sustainable Business Model Innovation*. Springer International Publishing.

Karafiath, I. (2014). Estimating cross-sectional regressions in event studies with conditional heteroskedasticity and regression designs that have leverage. International Journal of Managerial Finance, Emerald Group Publishing Limited, 10(4), 418-431.

Kotchen, M. J., & Moon, J. (2011). Corporate Social Responsibility for Irresponsibility. *NBER Working Paper No. w17254*. https://ssrn.com/abstract=1898510

Kothari, S.P., & Warner, J. B. (2006). Econometrics of event studies (E. Eckbo, Ed.). In *Handbook of empirical corporate finance*. North-Holland: Elsevier.

Krueger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, *115*(2), 304-329.

Lodh, A. (2020, February 25). *ESG and the cost of capital*. MSCI. Retrieved April 19, 2023, from https://www.msci.com/www/blog-posts/esg-and-the-cost-of-capital/01726513589

Luo, J., Meier, S., & Oberholzer-Gee, F. (2012). No news is good news: CSR strategy and newspaper coverage of negative firm events. *Harvard working paper*.

Lyon, T. P., & Maxwell, J. W. (2011). Greenwash: Corporate environmental disclosure under threat of audit. *Journal of Economic and Management Strategy*, *20*(1), 3-41.

MacKinlay, C. A. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, *35*(1), 13-39. http://www.jstor.org/stable/2729691

Oikonomou, I., Brooks, C., & Pavelin, S. (2012). The Impact of Corporate Social Performance on Financial Risk and Utility: A Longitudinal Analysis. *Financial Management*, *41*(2), 483-515. http://www.jstor.org/stable/41493874

PwC. (2022). *PwC's Global Workforce Hopes and Fears Survey 2022*. PwC. Retrieved April 12, 2023, from https://www.pwc.com/gx/en/issues/workforce/hopes-and-fears-2022.html

PwC. (2023, February 16). *Global Consumer Insights Survey 2023: Frictionless retail and other new shopping trends*. PwC. Retrieved April 12, 2023, from https://www.pwc.com/gx/en/industries/consumer-markets/consumer-insights-survey.html

RepRisk. (n.d.). *RepRisk methodology overview*. RepRisk. Retrieved April 17, 2023, from https://www.reprisk.com/news-research/resources/methodology

Schmidt, A. (2019). *Sustainable News – A Sentiment Analysis of the Effect of ESG Information on Stock Prices*. SSRN. http://dx.doi.org/10.2139/ssrn.3809657

Sefcik, S. E., & Thompson, R. (1986). An Approach to Statistical Inference in Cross-Sectional Models with Security Abnormal Returns As Dependent Variable. Journal of Accounting Research, 24(2), 316-334. https://doi.org/10.2307/2491136

Serafeim, G. (2021). ESG: Hyperboles and Reality. *Harvard Business School Research Paper Series Working Paper 22-031*. http://dx.doi.org/10.2139/ssrn.3966695

Serafeim, G., & Yoon, A. (2021). Stock price reactions to ESG news: the role of ESG ratings and disagreement. *Review of Accounting Studies*. https://doi.org/10.1007/s11142-022-09675-3

Serafeim, G., & Yoon, A. (2022). Which Corporate ESG News does the Market React to? *Financial Analysts Journal, Harvard Business School Accounting & Management Unit Working Paper*, *No. 21-115*. https://ssrn.com/abstract=3832698

Servaes, H., & Tamayo, A. (2013). The Impact of Corporate Social Responsibility on Firm Value: The Role of Customer Awareness. *Management Science*, *59*(5), 1045–1061. http://www.jstor.org/stable/23443926

Strong, N. (1992). Modelling Abnormal Returns: A Review Article. *Journal of Business Finance & Accounting*, *19*, 533-553.

Teng, C.-C., & Yang, J. (2021). Media exposure on corporate social irresponsibility and firm performance. *Pacific-Basin Finance Journal*, *68*(1), 1-23. https://doi.org/10.1016/j.pacfin.2021.101604

Tirole, J. (2006). *The theory of corporate finance*. Princeton, N.J : Princeton University Press

World Economic Forum. (2021). *What is stakeholder capitalism? It's History and Relevance*. The World Economic Forum. Retrieved May 30, 2023, from https://www.weforum.org/agenda/2021/01/klaus-schwab-on-what-is-stakeholder-capitalism-history-relevance/

Zhu, A. (2022). Linear Regression with OLS: Unbiased, Consistent, BLUE, Best (Efficient) Estimator. Towards Data Science. https://towardsdatascience.com/linear-regression-with-ols-unbiased-consistent-blue-best-efficient-estimator-359a859f757e

Appendix

Appendix 1: OLS Assumptions

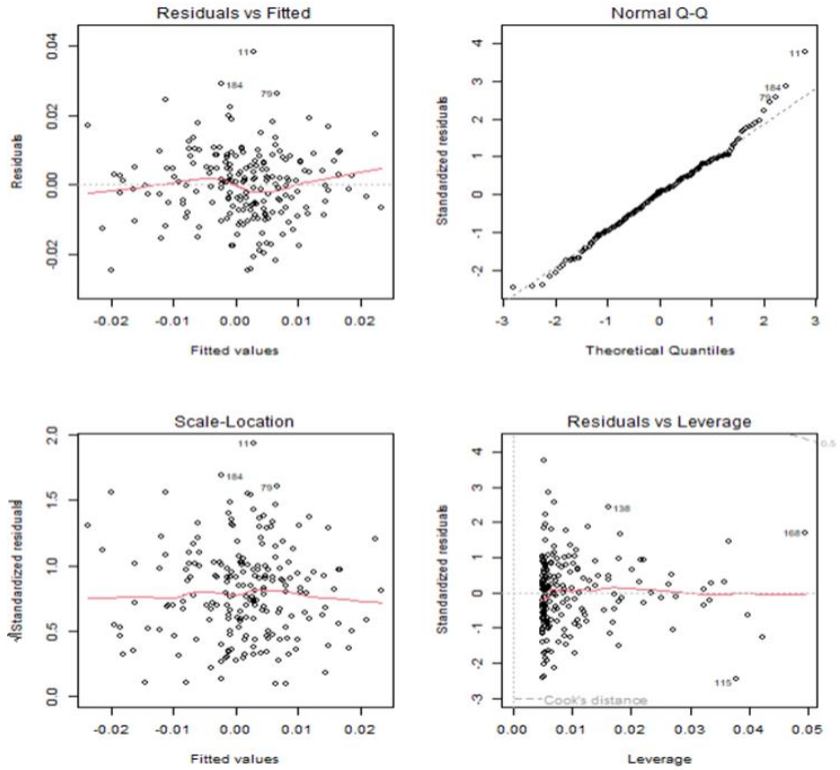
In order to ascertain the applicability of a t-test and to establish the best linear unbiased (blue) estimators for the market model, it is necessary to examine the six assumptions of ordinary least squares (OLS) regressions as defined in Woolridge's publication from 2012.

Table 16: OLS Assumptions

Assumption	Description	Properties
Assumption 1	Linear in parameters	
Assumption 2	No perfect multicollinearity	
Assumption 3	Zero conditional mean	The ordinary least squares (OLS) estimators are unbiased under the condition that assumptions 1 through 3 are met.
Assumption 4	Homoskedasticity	
Assumption 5	No serial correlation	The OLS estimators are considered BLUE provided that assumptions 1-5 are met.
Assumption 6	Normality	The OLS estimators display a normal distribution if assumptions 1 through 6 are true. Additionally, each t-statistic follows a t-distribution under the null hypothesis.

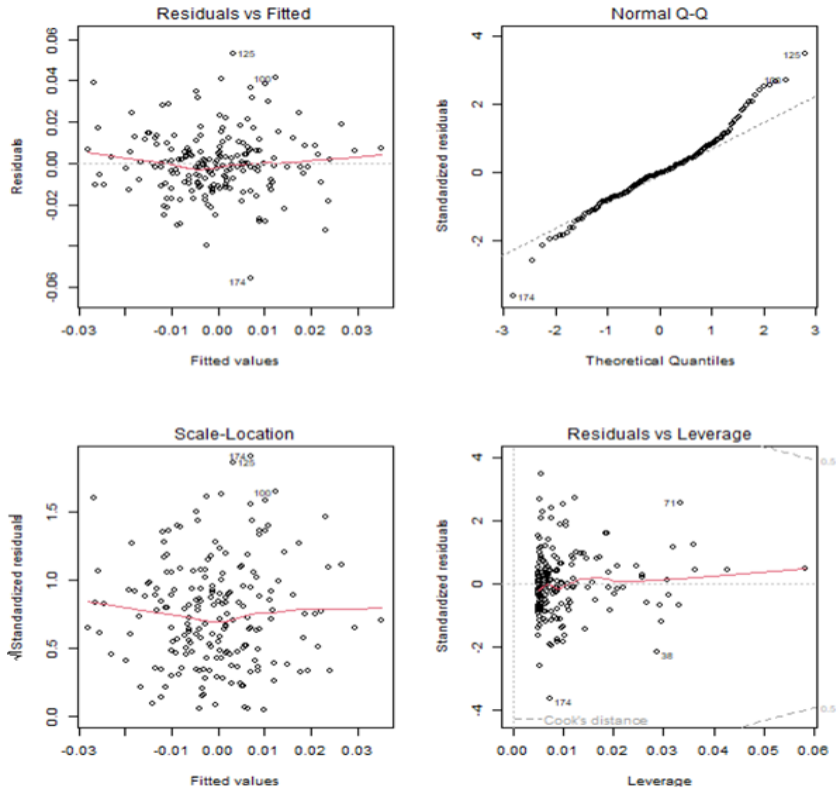
***Note**: The table displays the 6 assumptions which have to be fulfilled in order to perform the OLS regression. As only 1 dependent variable is included in the market model (the index) assumption 2 holds by default.*

Figure 4: Residual Plots for Apple Inc



Note: The four graphs above illustrate any violation of the OLS assumptions for Apple Inc.

Figure 5: Residual Plots for Barclays PLC

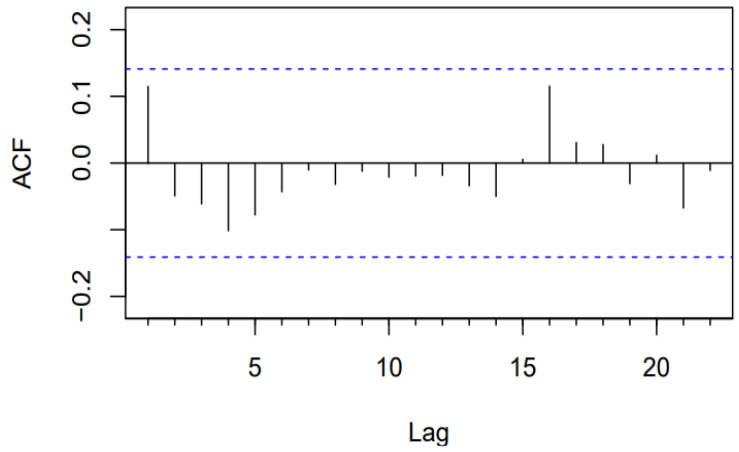


Note: The four graphs above illustrate any violation of the OLS assumptions for Barclays PLC.

The two residual plots are from the market model regression with Apple and Barclays PLC and the respective indexes S&P 500 and Eurostoxx50, for their individual event date, where the normal returns are estimated within the estimation window [-200, -2]. The plot in the top left corner displays the relationship between residuals and fitted values, serving as a means to assess the validity of the linear relationship assumption and whether the residuals exhibit a consistent mean of zero. In both cases, the line appears almost horizontal and close to zero, suggesting the presence of a linear relationship for both Apple Inc and Barclays PLC. The Q-Q plots in the top right corner provide insights into the normality of the residuals. In the case of Apple Inc, the residuals closely align with the expected diagonal line, indicating a relatively normal distribution. However, for Barclays PLC, the Q-Q plot reveals deviations from the expected diagonal line in the higher quantiles (2-3). This departure from normality suggests the presence of outliers, heavy-tailed distributions, or other factors affecting the underlying data in those specific regions. The scale-location plot, located in the bottom left, is used to assess the variance of the residuals. When the plot exhibits a horizontal line with evenly dispersed points, it suggests homoskedasticity, indicating consistent variability of the residuals across the range of fitted values, which seems to be true in figures 4 and 5. The bottom right plot, known as the residual vs. leverage plot, serves to identify influential outliers within the estimation window. In this case, the data points appear to fall within the Cook's distance, suggesting that extreme values do not exert significant influence on the regression results. This observation holds true for both firms.

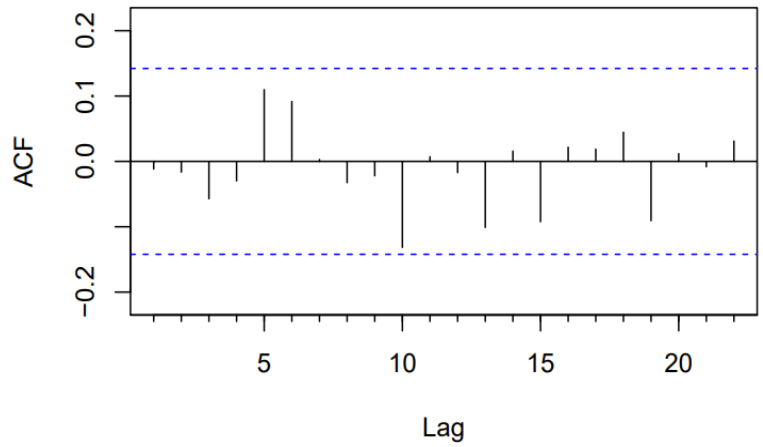
Appendix 2: Autocorrelation in the residuals

Figure 6: Residual Autocorrelation Apple Inc



Note: The plot represents the autocorrelation for Apple Inc.

Figure 7: Autocorrelation Barclays PLC

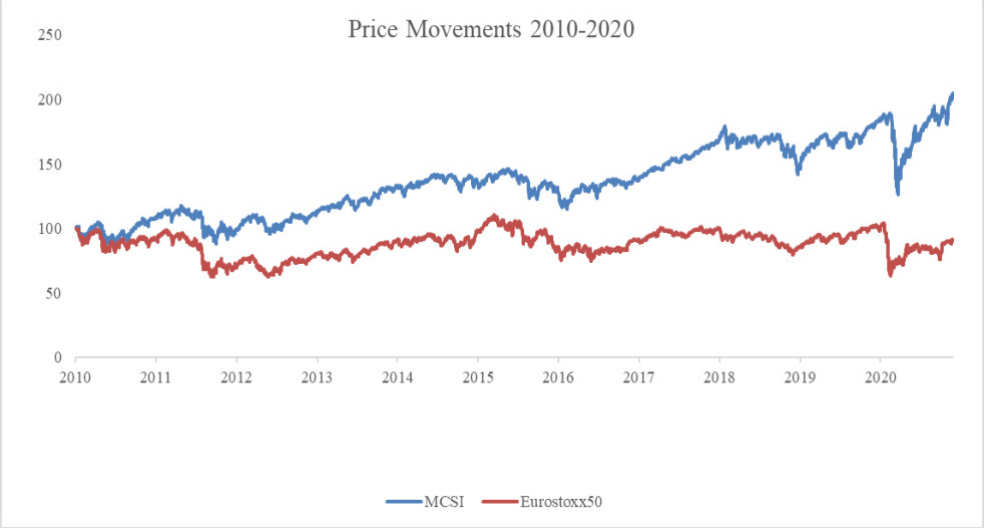


Note: The plot represents the autocorrelation for Barclays PLC.

Figures 6 and 7 are present to give a visualization for autocorrelation for Apple Inc and Barclays PLC form the market model in the estimation window [-200, -2]. The ACF describes the average relationship between data points in a time series and the preceding data points. The y-axis represents the degree of autocorrelation, while the x-axis is the number of lags. The level that exceeds the blue line is significant. As seen in the two plots it does not inherit any signs of autocorrelation for the two securities, nor the rest of the sample.

Appendix 3: Index selection

Figure 8: Price development of the Eurostoxx50 and MSCI World Index



Note: The table above illustrates the price development of the two market indices that were considered for the calculator of the market model for the European firms

The analysis of the MSCI index reveals a higher level of volatility compared to Eurostoxx50. However, despite this disparity, both indices demonstrate a general alignment in terms of price movement. Notably, the MSCI index exhibits an overall higher price development when compared to Eurostoxx50.

Table 17: Testing the fit of the two indices on 4 European firms.

Barclays		**BHP**		**SHELL**		**L'oreal**	
Eurostoxx50		***Eurostoxx50***		***Eurostoxx50***		***Eurostoxx50***	
Regression Statistics		*Regression Statistics*		*Regression Statistics*		*Regression Statistics*	
Multiple R	0,586234	Multiple R	0,621525	Multiple R	0,629479	Multiple R	0,760843
R Square	0,343671	R Square	0,386293	R Square	0,396244	R Square	0,578881
Adjusted R Squar	0,340356	Adjusted R Square	0,383194	Adjusted R Square	0,393194	Adjusted R Square	0,576755
Standard Error	0,01517	Standard Error	0,017183	Standard Error	0,009983	Standard Error	0,009759
Observations	200	Observations	200	Observations	200	Observations	200
MCSI World Index		***MCSI World Index***		***MCSI World Index***		***MCSI World Index***	
Regression Statistics		*Regression Statistics*		*Regression Statistics*		*Regression Statistics*	
Multiple R	0,086708	Multiple R	0,242975	Multiple R	0,030531	Multiple R	0,042838
R Square	0,007518	R Square	0,059037	R Square	0,000932	R Square	0,001835
Adjusted R Squar	0,002506	Adjusted R Square	0,054285	Adjusted R Square	-0,00411	Adjusted R Square	-0,00321
Standard Error	0,018654	Standard Error	0,021277	Standard Error	0,012842	Standard Error	0,015024
Observations	200	Observations	200	Observations	200	Observations	200

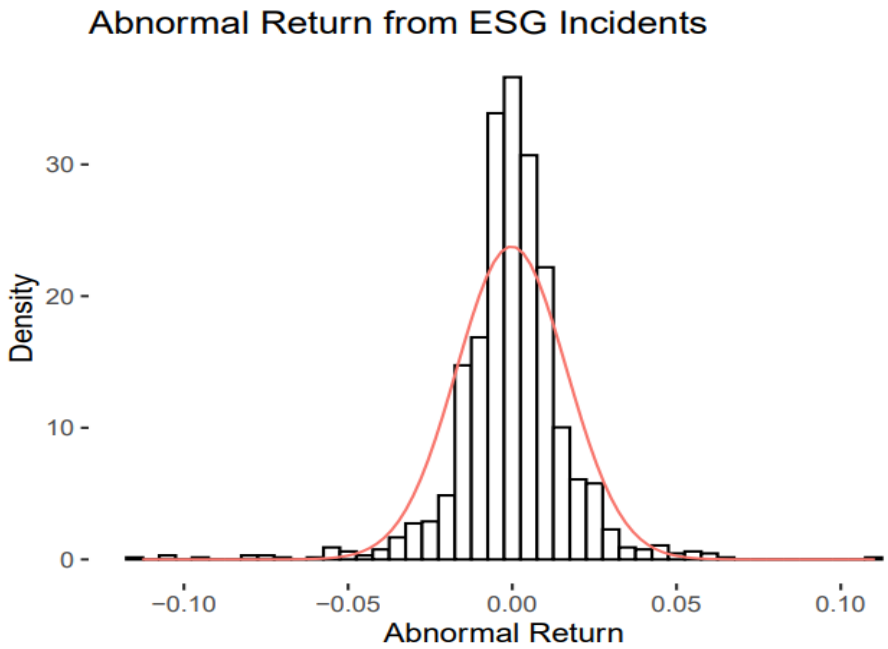
Note: The table presents the different regression on the 4 unique firms using the two different market indices. The output is a result of running a linear regression analysis by using the "least squares" method for the estimation window of [-200, -2] for both the MSCI and the Eurostoxx50.

In this study, we aimed to assess the fit of individual European firms to either the Eurostoxx50 or the MCSI World Index. We specifically selected four firms, namely Barclays PLC, BHP, Shell, and L'Oréal, based on their market capitalization exceeding 100 billion on the event day. To evaluate the fit, we utilized the statistical measure known as R-squared (R^2). R-squared provides insights into the proportion of the variation in the dependent variable, which in our case is the stock returns, that can be explained by the independent variable (x), representing the index return, within a regression model. It serves as an indicator of the quality of fit of the regression model. Figure 6 demonstrates our findings, indicating that the Eurostoxx50 exhibited a notably superior fit for the selected stocks compared to the MCSI World Index. This suggests that the Eurostoxx50 index better explains the variability observed in the stock returns of the European sample firms.

Appendix 4: Distribution of Abnormal Returns

In order to ensure reliable inferences, it is necessary to satisfy the assumption of a normal distribution for the abnormal returns within the event window when conducting a t-test. To examine this assumption, we employ a histogram with density plots for abnormal returns for the full sample, encompassing all events. The resulting figure provides a visual representation of the distributions.

Figure 9: Histogram of Abnormal Returns



Note: The histogram is the abnormal return for the whole sample of 329 firms/incidents spanning from 2010 to 2020 with the event window of [-1:2]. We see that the distribution is clearly normal distributed, however there is evidently some long tails especially on the negative side of the x-axis. This is however not surprising as we look at only negative incidents as it would be assumed that firms would experience some negative effect in the form of negative abnormal returns. We do not believe this threatens the assumptions of normal distribution and furthermore the validity of our t-tests.