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School of Business and Management

Strategic Finance and Business Analytics (MSF)

Master's thesis

**STOCK MARKET REACTION TO NEGATIVE CORPORATE SUSTAINABILITY
NEWS: A COMPARATIVE STUDY OF MARKET REACTIONS IN EUROPE AND
ASIA**

2020

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ABSTRACT

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This thesis examines the short-term market reactions to negative corporate sustainability-related news announcements. The stock market reactions are compared between Europe and Asia to assess how the region and different market conditions affect investor reactions. Furthermore, the thesis investigates how the results differ across different corporate sustainability factors; economic, social, and environmental.

Event study methodology is used to examine the stock market reactions. The dataset consists of 209 news articles published between the 1st of January 2010 and the 31st of December 2019. 105 articles are about publicly listed companies in Europe, and 104 are about publicly listed companies in Asia.

The main results of this study indicate significantly negative market reactions in both regions in the short-term (± 41 days). Investors tend to penalize companies for their unsustainable behavior. The results also suggest that the market reaction in Europe is more intense than in Asia. On the event date, the average abnormal return in Europe is -1.43%, and the average abnormal return in Asia is -0.174%. When comparing the results across different news categories, the results show that the reactions are more significant for the news announcements with economic content in both regions. Moreover, shareholders of European companies are significantly affected by the news with social and environmental content. In Asia, the corresponding investor responses are insignificant.

TIIVISTELMÄ

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Tässä tutkielmassa tarkastellaan markkinoiden lyhyen aikavälin reaktioita negatiivisiin uutisiin, jotka liittyvät yritysten kestäväen kehitykseen. Markkinareaktioita verrataan Euroopan ja Aasian välillä, jotta voidaan arvioida kuinka sijainti ja markkinaolosuhteet vaikuttavat sijoittajien reaktioihin. Lisäksi tutkielmassa selvitetään, miten tulokset vaihtelevat eri kestäväen kehityksen tekijöiden välillä: taloudellinen, sosiaalinen ja ekologinen.

Osakemarkkinoiden reaktioiden tutkiminen toteutetaan tapahtumatutkimuksena. Tutkielman aineisto koostuu yhteensä 209 uutisartikkelista. Uutisartikkelit on julkaistu aikavälillä 1.tammikuuta 2010 - 31. joulukuuta 2019. Aineistosta 105 artikkelia käsittelee Euroopassa listattuja yrityksiä ja 104 Aasiassa listattuja.

Empiiriset tulokset osoittavat, että markkinareaktiot ovat merkittävästi negatiivisia lyhyellä aikavälillä (± 41 päivää) sekä Euroopassa että Aasiassa. Tulokset viittaavat siihen, että sijoittajat rankaisevat yrityksiä kestäväen kehityksen vastaisesta toiminnasta. Tulokset osoittavat myös, että markkinareaktio on voimakkaampi Euroopassa kuin Aasiassa. Euroopassa keskimääräinen epänormaalityttö on tapahtumapäivänä $-1,43\%$ ja Aasiassa vastaava epänormaalityttö on $-0,74\%$. Kun tuloksia vertaillaan uutiskategorioiden välillä, havaitaan, että talouteen liittyvät uutiset johtavat merkittävimpiin markkinareaktioihin Euroopassa ja Aasiassa. Euroopassa sijoittajat reagoivat merkittävästi myös sosiaalisen-ja ekologisenkategorian uutisiin. Aasian osalta vastaavat reaktiot eivät ole merkittäviä.

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Helsinki, December 2020

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LIST OF ABBREVIATIONS

CS	Corporate Sustainability
CSP	Corporate Sustainability Performance
CFP	Corporate Financial Performance
ESG	Environmental, Social, Governance
EMH	The Efficient Market Hypothesis
CSR	Corporate Social Responsibility

1. Introduction

Over the past years, people have paid increasing attention to climate change concerns and long-term sustainability and proclaimed more demands to companies for transparency and responsibility. Growing international pressure has forced companies to align their strategies with ideological changes and commit to corporate sustainability practices. In these circumstances, companies have no choice but to take a more active role in meeting the world's long-term sustainable challenges.

Corporate sustainability is often described as the commitment of companies to obtain a competitive advantage by adopting business strategies and activities that are aligned with the current needs of the company and stakeholders, as simultaneously developing and sustaining socially and ecologically supportive activities and processes to meet the needs also in the future (Flouris & Yilmaz 2010; IIDS 1992). Nearly all business decisions encompass social and environmental matters, and many companies have recognized the value of sustainability for the future of their businesses (AICPA, CICA & CIMA 2010).

The increasing public interest in sustainability has also aroused researchers' interest and led to several studies on the subject. Many researchers have shown the relationship between sustainability engagement and company risk and the association with corporate financial performance (Djajadikerta, Zhang & Zhang 2018). While many corporate sustainability initiatives originate in response to legislation and compliance requirements, more companies are nowadays deploying sustainable strategies to gain greater shareholder value (AICPA, CICA & CIMA 2010).

Furthermore, companies align their strategies to corporate sustainability as it has been recognized that it offers new business opportunities and enables them to gain a competitive advantage to some extent (Lourenco, Branco, Curto & Eugénio 2012). In addition to direct impacts on financial performance, sustainability engagement also provides risk management opportunities. It may help to control long-term risk and to refine risk management. (Djajadikerta, Zhang & Zhang 2018; Flouris & Yilmaz 2010)

As investors are increasingly interested in responsibility and sustainability, companies are even more vulnerable to corporate scandals and negative news than before. In today's world,

irresponsible actions may easily lead to severe reputational damage, legal consequences, and financial losses. Thus, it is essential for companies to understand how investors value corporate sustainability.

The purpose of this study is to assess how investors react to negative news announcements related to corporate sustainability in the short-term and how the announcements may affect the financial performance of companies. The results will shed light on how necessary it is to engage in corporate sustainability and consider the issues in risk management to preserve the financial value. The market reactions are examined and compared in two regions: Europe and Asia. Thus, it can be evaluated whether the region and different market conditions affect the results. Furthermore, both regions' news is examined further in the three categories of corporate sustainability: economic, social, and environmental.

Several previous studies have researched the relationship between financial performance and responsibility. However, there is little literature on the relationship between corporate financial performance and corporate sustainability. Moreover, most of the existing studies focus on how positive announcements impact market reactions, whereas this study focuses on how negative announcements affect stock returns. This study also contributes to the existing literature by examining the market reactions with more recent data from 2010 to 2019. Furthermore, the literature for market reactions in Europe and Asia is rather scarce, and no previous comparative studies have been conducted between the markets. The empirical study follows the event study methodology.

1.1 Research objectives

The purpose of this study is to examine the short-term reactions of the stock prices to the news announcements regarding corporate sustainability incidents during the years from 2010 to 2019. The study will also compare the market reactions of the two markets: Europe and Asia. Additionally, both markets' corporate sustainability news announcements are further examined in three categories: economic, social, and environmental. The study includes news of companies listed on European and on Asian stock exchanges. The aim of this study is to answer the following research questions:

- *Do negative corporate sustainability-related news announcements cause a market reaction to the stock prices in Europe?*
- *Do negative corporate sustainability-related news announcements cause a market reaction to the stock prices in Asia?*
- *Are there differences in abnormal stock returns between Europe and Asia?*
- *Does the impact of the event disappear soon after the event date? Are the impacts temporary?*
- *Are there differences in market reactions depending on the news category (economic, social, environmental) in Europe?*
- *Are there differences in market reactions depending on the news category (economic, social, environmental) in Asia?*
- *Are there differences between Europe and Asia on how markets react to different news topics (economic, social, environmental)?*

Even though there are quite many previous studies about sustainability and market reactions, only a few studies about market reactions to negative sustainability-related news articles have been made. Also, most of the previous studies focus on corporate social responsibility (CSR) or ESG-factors. In contrast, this study focuses on corporate sustainability. Also, there are no similar studies conducted for the most recent years. This study also examines whether there are differences in market reactions in different geographical market areas. Although some previous studies about market reactions in Europe and Asia have been conducted, no comparative studies have been carried out between the two markets so far.

1.2 Limitations

In this study, the limitations relate to the methodology and data. The limitations of the methodology are described in section 5.4; beta instability, determination of the event date, and white noise. Also, in chapter 7.4, a robustness check is performed to test the stability of the beta.

In addition to the limitations of the methodology, there are some limitations related to the data. One prominent limitation is selection bias. The news is collected case-by-case basis; thus, the researcher's assessment has influenced which events are selected for the sample. However, the risk of selection bias is reduced by applying the built-in selection criteria in the selection process.

Moreover, the results reported in this study consider solely short-term market reactions. The long-term impacts are outside the scope of this study due to the fact that long-term analyses are often rather unreliable. The reactions are examined in a 41-day time window. Therefore, these results cannot be generalized to persist in the long run.

1.3 Structure of the thesis

This study is divided into eight sections. The structure of this study proceeds as follows: In the second section, the theoretical background is presented. The section includes an introduction to the concept of corporate sustainability, reviewing the relationship between corporate sustainability and the financial performance of a company, as well as the recent trends of sustainable investing. Also, the theory of the efficient market hypothesis is introduced

In the third section, the previous literature of the market reactions to events announcements is reviewed. In the fourth section, the event data and the market data used in this study are described. Furthermore, the event selection process is defined in the section.

Subsequently, in section 5, the research methodologies, models, and formulas are determined. In section 6, the research hypotheses are defined. The empirical results are

presented in section 7, and finally, in section 8, the study is concluded, and potential future research subjects are suggested.

2. Theoretical background

The theoretical background will be based on previous literature regarding corporate sustainability, the relationship between corporate sustainability (CS) and corporate financial performance (CFP), and market efficiency. This chapter will shed light on the relevance of corporate sustainability behavior and how sustainable behavior is valued. Figure 1 visualizes the theoretical background in terms of how news announcements regarding irresponsibility impact corporate financial performance via investor reactions.

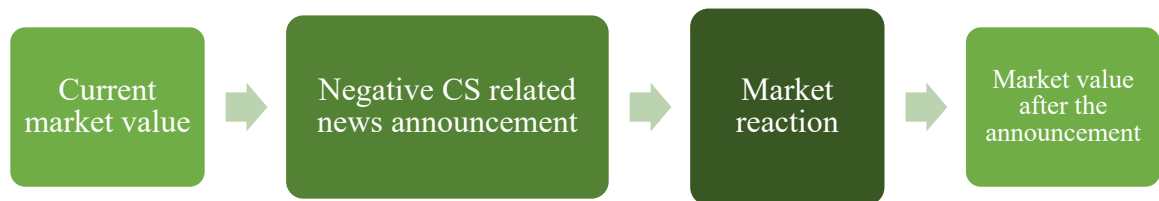


Figure 1. The theoretical background of negative CS-related news announcement and its impacts.

The theory is divided into five subsections: The first subsection briefly introduces the concept of corporate sustainability and the key drivers behind it. The second subchapter reviews the connection between corporate sustainability and financial performance. The third subchapter sheds light on how sustainable investing has grown over the years and why investors might value sustainability. In the fourth subchapter, the Efficient market hypothesis is introduced, and its' criticisms are briefly reviewed. The hypothesis is very closely related to this study since market reactions are based on this hypothesis. Finally, previous studies regarding the relationship between sustainability-related announcements and market reactions are visited.

2.1 Corporate sustainability (CS)

Corporate sustainability (CS) has been studied in the social sciences since the middle of the 20th century (Christofi, Christofi & Sisaye 2012). As a result, sustainability issues have obtained increasing attention around the world among companies and their shareholders. (Roca & Searcy, 2012). In the past few decades, companies have introduced and changed policies, products, and processes to control and address pollution, minimize the use of resources, and improve stakeholder relations (Linnenluecke & Griffiths 2010). Historically, CS has evolved as a result of economic growth, promoting social equity and justice, and enforcing environmental legislation (Christofi et al. 2012).

The concept of CS derives from the broader concept of sustainability, which itself was shaped over time through several political, academic, and public influences. The term sustainable development became known globally with the publication of the report *Our Common Future*, which was released by the World Commission on Environment and Development. (Linnenluecke et al. 2010). The report defines sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987).

The term CS itself does not have a universal definition but, for example, International Institute for Sustainable development has described CS as “adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future” (IISD 1992). The objective is that companies voluntarily take initiatives to broaden the traditional economic goal, which leads to maximizing shareholder wealth, including social and environmental factors (Christofi et al. 2012).

Sustainability, as well as corporate sustainability, is usually described as three intersecting circles, the “Triple Bottom Line” or the “3Ps”: economic (profits), society (people), and environment (planet), as presented in Figure 2. Sustainability thus requires balancing and compromising between these three bottom lines. The economic factor focuses on profits since to be sustainable, a company has to be profitable. Therefore, it is a matter of maximizing income whilst preserving capital stock. Also, many scholars include issues of corporate governance to the economic factor; thus, those issues are also applied in this study.

The social factor considers matters relating to, for example, human capital development, labor practices, health, and safety. The environmental factor encompasses environmental performance, reducing harmful impacts, using renewable sources, and other activities to preserve biological and physical systems. (Purvis, Mao & Robinson, 2019; Montiel & Delgado-Ceballos 2014).



Figure 2. A typical representation of sustainability. (Purvis, Mao & Robinson 2019)

The economic factor of corporate sustainability is often the one in which most of the companies have a solid foundation and what drives the business. At least in the financial world, the generally accepted view is that the primary goal of a listed company is to maximize the value of the company and thus maximize shareholder wealth. While the goal of maximizing shareholder wealth is widely accepted, other approaches have been introduced alongside it. One alternative approach is the stakeholder theory. According to Freeman's (1984) theory, companies are not solely accountable to their shareholders. Instead, companies should try to find a balance between the interests of all their stakeholders', who may be affected by the achievement of their objectives. (Marrewijk 2003)

Several discussions have been going on about the possibilities and the financial payoff of CS. Many scholars have proved or denied that the implementation of CS is solely for financial reasons (Ionescu-Somers, Salzmann & Steger 2005). According to Lozano (2015), there are externally and internally motivated drivers why companies integrate sustainability. The external drivers include, for example, regulation, customer demand for transparency, reputation, and access to resources, whereas internal drivers encompass leadership,

sustainability reporting, a business case for change, company culture, and the principle of preserving the environment. (Sroufe 2017)

In 2010, the American Institute of Certified Public Accountants (AICPA), the Canadian Institute of Chartered Accountants (CICA), and the Chartered Institute of Management Accountants (CIMA) conducted a study about the evolution of corporate sustainability practices in the UK, US, and Canada. Among other things, they studied the drivers of sustainability. Their results for the most critical sustainability drivers are represented in Figure 3, which presents to what extent companies' CS activities are motivated by the below-presented reasons.

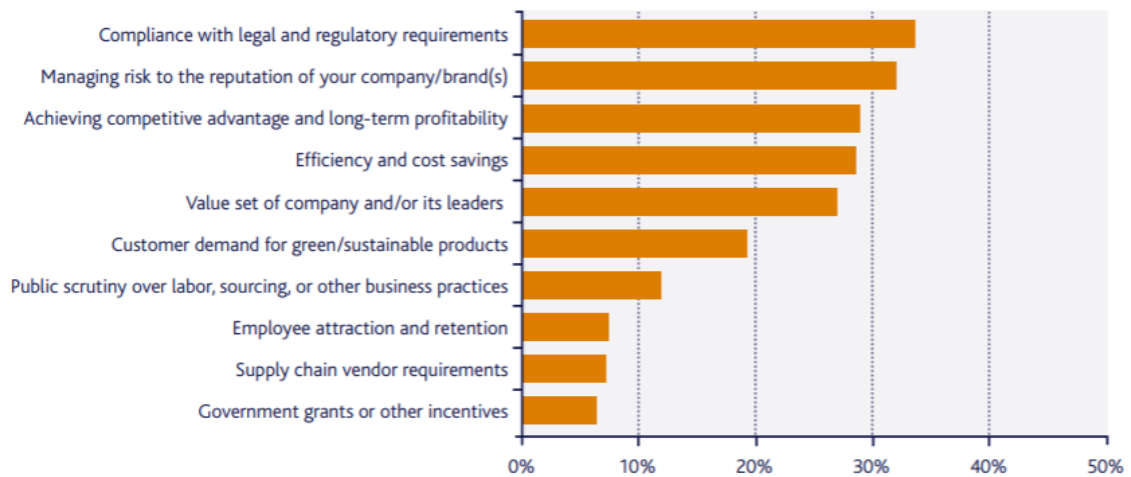


Figure 3. Critical sustainability drivers – large companies. (AICPA, CICA & CIMA 2010)

According to the study, respondents highlighted the compliance requirements as the most crucial driver for CS. The second most important driver was the ability to manage the risk of losing reputation by implementing CS. (AICPA, CICA & CIMA 2010) Thus, it can be argued that companies do not solely integrate CS for financial reasons. However, the report also shows that the immediate financial impacts, such as long-term profitability, are highly appreciated. Furthermore, it should be noted that like investors, also companies value things differently, and hence what is important to one company may not be valued by another (AICPA, CICA & CIMA 2010).

2.2 Sustainability and financial performance

For the past decades, various scholars have tried to examine the relationship between corporate sustainability and corporate financial performance (CFP). According to Grewatsch and Kleindienst (2017), despite numerous studies in the field, the findings on the relationship between CS and CFP have been inconsistent. However, they argue that this is not surprising since there is a broad spectrum of organizational and environmental influences affecting CFP. Thus, it is not justified to give such a general explanation for the relationship.

For example, Ameer and Othman (2012) studied the CFP of top global corporations. They assumed that companies with better sustainability practices would also have better financial performance and faster growth than companies that do not follow sustainability practices. The results indicate that those companies investing in sustainability practices have higher financial performance measured by return on assets, cash flow from operations, and profits before taxes. Moreover, they noted that according to the indicators, the performance increased consistently between the years 2006-2010.

Weber (2017) analyzed whether Chinese banks could implement sustainability regulations without a negative impact on financial performance. The findings prove bi-directional causation between CS and CFP. According to the results, implementing sustainability did not negatively affect the financial performance of the banks but on the contrary, increased the performance. Weber even concludes that Chinese banks should further invest in CS to enhance their performance and re-invest excess resources in such activities that support CS.

Chang and Kuo (2008) studied 624 global public firms and examined the relationship between corporate sustainability development and financial performance. According to the results, companies with higher sustainability performance do sometimes perform better as their profits are positively affected. In contrast, they also note that companies with lower sustainability performance tend to be negatively affected in terms of profits.

Lourenco, Branco, Curto & Eugénio (2012) analyzed a sample of companies from the US. They studied how CSP reflects the value of a company. The results show that investors value CSP and that CSP significantly explains the value of a company, for example, measured by earnings and book value of equity. They also argued that markets penalize large profitable companies with low CSP levels.

Similarly, Lo and Sheu (2007) studied the relationship between CS and market value. They performed the study on large US companies that were included in the S&P 500 for the period 1999-2002. According to the results, there is a strong positive relationship between CS and market value. Lou and Sheu also find that CS is strongly associated with the growth of sales. They conclude that companies with higher levels of CSP tend to be more likely recognized with a higher valuation in the markets.

In contrast, López, Garcia, and Rodriguez (2007) found a negative impact on performance. They studied the relationship between sustainable development and corporate performance by examining 110 European companies over the period 1998-2004. Their results indicate that when companies implement sustainability practices, the effects on financial performance are adverse during the first few years after they are applied.

Rennings, Schröder & Ziegler (2003) obtained mixed results when they compared environmental and social factors. They performed the study for listed European companies for the period 1996-2001. According to the results, superior social performance has a negative effect on the firm value, whereas superior environmental performance has a significantly positive effect. However, they state that the overall sustainability performance does not have a significant impact on the average monthly returns.

As stated before, no general answer exists on how corporate sustainability practices influence financial performance; Grewatsch et al. (2017) argued, there are numerous ways to practice CS. Thus, the impacts on financial performance may vary across different practices and activities. Kurapatskie and Darnell (2013) examined what type of CS activities are associated with higher financial performance. They divided sustainability activities into lower-order and higher-order activities. Activities that already exist but are improved are categorized as lower-order activities. These can be, for example, existing processes or products that are improved. On the contrary, higher-order activities refer to much more radical changes in practices, for example, completely new processes or products that are designed to replace the old ones. According to the study, the higher-order activities are associated with greater financial performance. However, also, lower-order activities have positive financial impacts.

They argued that one reason why higher-order activities have higher chances to generate better financial performance is that higher-order activities are harder to replicate by

competitors. All in all, they conclude that managers may believe that higher-order activities are riskier and more expensive to adopt, and thus may be less willing to implement them. Nevertheless, the companies that are willing to reach more by implementing higher-order sustainability activities are more likely to gain greater financial performance while doing good. (Kurapatskie & Darnell 2013)

2.3 Sustainable investing

In the 21st century, sustainable investing has grown exponentially around the world. (Renneboog, Ter Horst & Zhang 2008). Modern ethical investing has emerged due to the growing social and environmental awareness of investors and the demand for more transparent business practices (Renneboog, Ter Horst & Zhang 2011). Sustainable investing, also known as socially responsible investing or ethical investing, is an investment approach that considers not only the economic side but also social, environmental, and governance issues (ESG) in the portfolio selection and management (Renneboog et al. 2008; MIT 2016). Thus, the goal of sustainable investing is to maximize financial returns as well as social and ethical good.

Globally, the sustainable investing market has grown continuously, by more than 34 percent during the years 2016-2019, with current assets under management worth over \$ 31 trillion. Of the total assets, \$ 17.5 trillion is managed in ESG funds. As is shown by Figure 4, the assets in responsible ETFs have risen over two-thirds in just two years. (Global Sustainable Investment Alliance 2018; The Financial Times 2019)

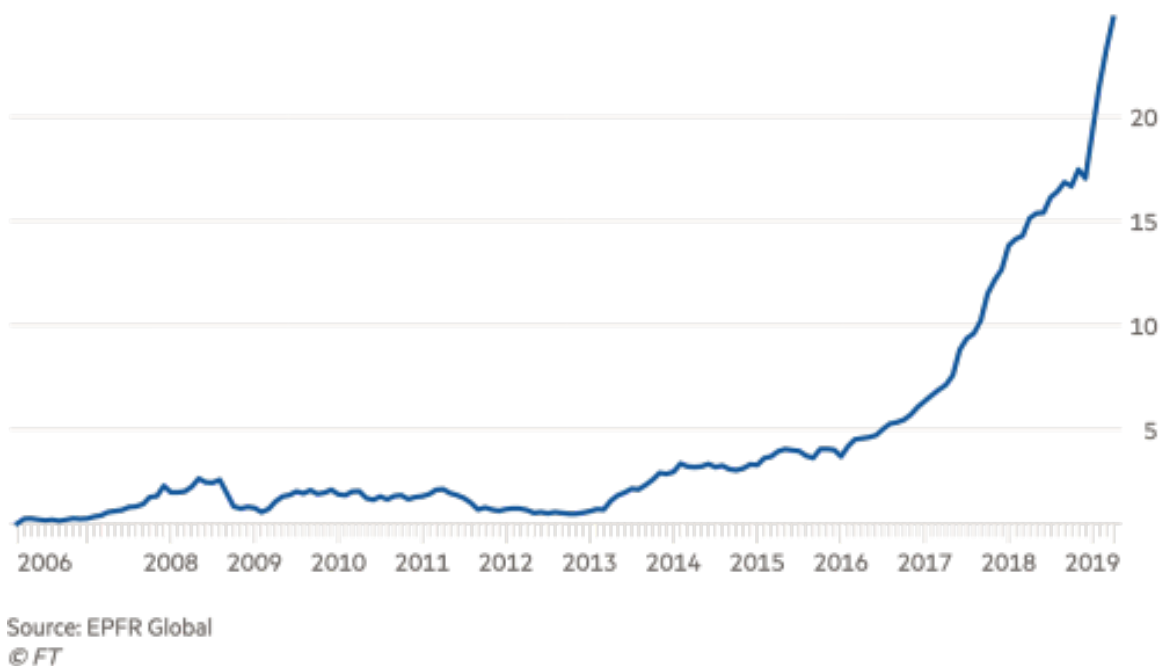


Figure 4. Growth in sustainable investing: Total assets in responsible ETFs (\$bn). (The Financial Times 2019)

Over the years 2016 and 2018, total assets allocated to sustainable investment strategies increased by 11 percent in Europe, whereas in Japan, corresponding assets quadrupled. In three years, the total amount of professionally managed assets increased from three percent to 18 percent. Japan thus became the third largest region in terms of such assets after Europe and the US. (Global Sustainable Investment Alliance 2018)

As previously demonstrated, investors are increasingly aware of social and ethical issues and more willing to include those issues in their investment decisions. Simultaneously, sustainable investing has increased at a significantly higher rate compared to conventional investing. (Cortez, Silva & Areal 2012) While investors are increasingly eager to invest in sustainable funds and securities, they are still demanding financial benefits. According to Rennebook et al. (2008), economic literature provides only little evidence that investors would make investment decisions based on factors unrelated to financial performance. However, their study suggests that investors who apply sustainable investment strategies are

less sensitive to past negative returns than conventional investors. Thus, financial performance is not the only factor influencing investment decisions.

According to the MIT Sloan Management Review's (2016) research report, investors associate sustainability with actual value. The research shows that 75 percent of investors name improved financial performance and operational efficiency arising from sustainability as a strong motivation to invest. Also, over 60 percent of investors see that strong corporate sustainability performance leads to reduced risk and lower cost of capital. They also named the reasons behind the increasing popularity and the key drivers of sustainable investing. According to the report, the growth of analytics and sophisticated modeling, as well as investors' growing abilities to monitor how and when sustainable investments create shareholder value, are important drivers. Another contributing factor has been the research by institutions and investment companies that combines effective management of sustainability issues with strong CFP. As a third driver, they mentioned the changed mindset within the investor community regarding the relationship between strong CSP, risk reduction, and value creation. (MIT Sloan Management Review 2016)

As stated earlier, not only companies but also investors are different in terms of what is valued and what is considered important. What might influence one's investment decisions might not be valued by others. Overall, companies' responsible behavior is usually seen as a sign of corporate stability and persistence, thereby increasing investors' confidence towards such companies. When companies face allegations about irresponsible behavior, the news announcements about incidents raise suspicion among investors regarding companies' prospects, which may lead to loss of reputation and thus impact companies' value. However, investors tend to favor companies with a good reputation implying that these companies are less vulnerable to negative news. Investors may rationalize that an incident regarding a company with a good reputation is a careless slip rather than systematic misbehavior. (Aouadi & Marsat 2016; Oberndorfer, Schmidt, Wagner & Ziegler 2013)

There may also be regional differences between investors. Lo, Tang, Zhou, Yenug, and Fan (2018) argue that, for example, in China, investors may react differently to irresponsible behavior regarding Chinese companies compared to how investors would respond in developed countries. They suggest that the reason why this happens is the unique political and social systems in China and the fact that Chinese companies may address irresponsible behavior differently compared to developed economies. Also, they argue that due to the

conditions in China, investors might have lower expectations towards Chinese companies and might thus be less sensitive to negative news.

2.4 Market efficiency (EMH)

According to the efficient market hypothesis (EMH), when stock prices fully reflect all available and relevant information, a capital market is seen as efficient. (Fama 1965) Therefore, in an efficient market, when new information appears, the news spreads fast, and the new information is immediately incorporated into the stock prices. Thus, investors will not be able to use the information to achieve abnormal risk-adjusted returns at the moment the investment is made. (Malkiel 2003) The hypothesis assumes sufficient conditions in the market. In such market, no transaction costs exist, information is available for everyone at no cost, and investors have rational expectations. (Fama 1970)

Fama (1970) presented three levels of efficiency to describe the financial markets. According to the hypothesis, markets can be divided into levels that are weak form, semi-strong form, and strong form. When historical information is reflected in the prices of securities, and no historical information can be used to achieve abnormal profits or to predict future share prices, the markets are weakly efficient. Thus, prices include information like previous trading volumes, price developments, and financial statements from previous years.

The semi-strong form states that in addition to the weak form conditions, investors will not be able to utilize publicly available information relevant to securities to obtain abnormal profits in relation to the risk consistently. Thus, the prices of the securities already include all publicly available information. (Fama 1970) This information includes, for example, press releases and other corporate releases as well as all news.

Finally, when markets meet the conditions of strong market efficiency, the prices reflect all information in the market. The information is not limited to historical and public information but also includes all the insider information about the companies. According to this form, markets are efficient in terms of information, and thus it is not possible to consistently beat the market even with access to all private information. However, Fama stated that strong efficiency does not fully hold in practice since not all information is available freely in the real world. (Fama 1970)

According to Fama (1997), many existing studies support the efficient market hypothesis, although some of the studies have proven, for example, overreactions of the market. Fama argues that in an efficient market, underreaction to an event will be roughly as frequent as an overreaction. He states that if anomalies are randomly divided between overreaction and underreaction, market efficiency holds. He also notes that anomalies are fragile in the long-term and that anomalies tend to disappear depending on which techniques and methodologies are used to measure them.

2.4.1 Criticism towards EMH

The efficient market hypothesis was initially derived from the random walk hypothesis, which was first introduced by Kendall (1953). The theory states that stock prices change according to a random walk, and thus price changes cannot be predicted by using historical information. The hypothesis assumes that if access to information is unrestricted and security prices immediately adjust to arising information, then the price change is independent of the previous day's price change, and today's price change will only reflect news announced today. Since it is unpredictable, price changes must also be thus unpredictable and random. (Malkiel 2003) Therefore, no arbitrage opportunities exist, and the only way to achieve above-average profits is to accept above-average risks (Malkiel 2005).

The efficient market hypothesis has also received much criticism. According to Malkiel (2003), in the 21st century, several economists and analysts began to believe that security prices would be at least partially predictable. Malkiel concludes in his paper that demonstrably some market participants are more irrational than others. Thus, some irregularities in pricing and even patterns that are predictable might emerge over time in the short term. However, he believes that the possible irregularities and patterns that could be found by analyzing past information will not persist and that investors are not able to exploit those to obtain abnormal returns.

The efficient market hypothesis has been vastly criticized by behavioral financial economists, who emphasizes behavioral and psychological elements (Malkiel 2003). According to Shiller (2003), the academic discussion has changed its focus from traditional econometric analyses to developing models of human psychology. He names market

“bubbles” as an example of inefficiency, which happens when speculative stock prices increase, creating profits for some investors, which again attracts public attention, further promoting enthusiasm, thus creating expectations for further price increases. The process may continue creating higher and higher expectations, eventually forcing the bubble to burst as price collapse. Also, behavioral economists have criticized the EMH’s assumption of rational markets. According to Lo (2005), many psychologists and experimental economists have proved several departures from rationality. This irrationality that derives from behavioral biases may induce market breakdowns, but it may also provide arbitrage opportunities for some investors.

3. Corporate sustainability-related events and stock value

In recent years sustainable behavior has become a norm, and companies are expected to behave accordingly. However, if corporate sustainability initiatives and actions are not valued by financial markets, companies do not have a solid incentive to start or continue to behave sustainably. (Cheung 2011). Therefore, for companies, it is essential to assess how investors value corporate sustainability. In the following subsections, some previous studies are presented. Subsections are divided by region to studies regarding Europe, Asia, and other regions.

3.1. Studies on Europe

Consolandi, Jaiswal-Dale, Poggiani, and Vercelli (2009) analyze the performance of Dow Jones Sustainability STOXX Index over time and compare the market performance to its official benchmark to study the relationship between global corporate social responsibility standards and the financial performance of European companies. They also perform an event study for the same data set to analyze the stock market reactions to inclusions and exclusions in the ethical index. The authors examine the abnormal stock returns ten working days before and after the event. And observe positive cumulative abnormal returns in case of inclusions that appeared before the announcement and culminated nearby the day of the effective inclusion and then attenuated. By contrast, in the case of exclusion, the returns began to decrease soon after the announcement and became negative shortly before the actual exclusion and continued to decline temporarily. They conclude that the impact in both cases is thus necessarily limited.

Cellier and Chollet (2011) conducted a short-term study on European markets to analyze stock market reactions to announcements of Vigeo Corporate Social Responsibility ratings over the years from 2004 to 2009. The data used in the study consists of 778 companies and 1945 announcements. The results indicate that the effects of announcements are significantly positive five days around the event $[-2,2]$. They also state that the returns are positive after the announcement regarding the rating, no matter whether the news is good or bad. The result is justified by the supposition that investors were able to anticipate the rating since Vigeo

uses publicly available information. Thus, the information was already incorporated into stock prices.

Fernandez-Izquierdo et al. (2009) performed a study on Spanish stock markets. They examine whether companies could achieve higher financial performance by responsible behavior and how markets react to news announcements regarding sustainability. Overall, they analyze news announcements of 11 publicly listed companies, which consist of 83 positive news and 73 negative news. They conclude that in the short-term, they find no evidence that sustainable behavior and related news announcements would lead to abnormal returns around the event date. Thus, there are no significant market reactions, indicating that investors do not appreciate positive news announcements or penalize companies over negative announcements.

3.2. Studies on Asia

Compared to Europe, only a few studies have been conducted on Asian markets. One of them was conducted by Cheung and Roca (2011), who study the market reactions in the Asia Pacific context. They analyze the impacts of sustainability and investor reactions by examining index exclusions and inclusions regarding the Dow Jones Sustainability World Index, including years from 2002 to 2010. Only those companies are included that are listed on stock exchanges in one of the nine Asia Pacific countries. They observe negative abnormal returns that were statistically significant. The result holds for both index exclusions and inclusions after the initial announcement. Hence, they conclude that investors in the Asia Pacific region value corporate sustainability differently compared to investors in Europe or US markets; Asian investors do care about sustainability but in a reverse way.

Xu, Zeng, and Tam (2012) estimate how markets in China react to information regarding environmental violations by listed companies. The event data includes revealed information of 57 Chinese companies regarding environmental violations in 2010. The results indicate that negative announcements of Chinese listed companies have a weak negative impact on share prices. They argue that the average reduction in share price is much lower compared to market reactions for similar announcements in developed countries or some other developing countries.

A more recent study performed by Li and Wu (2017) examines how the stock markets in China react to announcements of environmentally sustainable operations. They study announcements of 419 firms in manufacturing, wholesale, and retail industries from 2008 to 2016. According to the study, the reactions to environmentally sustainable announcements are significantly negative, with average abnormal returns being -0.46 %. In the worst cases, the loss in market value averaged over 5 %. However, they report that the market reactions became less significant the day after the announcement.

3.3. Studies on other markets

Elyan, Swales, Maris & Scott (1998) examine the relationship between corporate layoff announcements and market reactions. They examine the relationship by analyzing 646 layoff announcements announced during the years 1979-1991. According to the study, layoff announcements do not have a significant impact on market reactions. They state that in many cases, investors are aware of companies' financial difficulties, and thus the layoffs are anticipated, and the situation is already reflected in the share price. They find statistically significant negative CAAR in the pre-announcement period. However, they conclude that corporate layoffs usually take place after the declined performance, which explains the negative CAAR in the pre-announcement period.

Hallock (1998) investigates the connection between top executive pay, market reaction, and layoff announcements by examining headlines between the years 1987 and 1995. By analyzing 1287 layoff announcements he finds evidence that, on average, there is a slightly negative reaction after the layoff announcement. He also states that on the event date, on average, the company's share price drops only by 0.4 %. He concludes that it is also why CEOs are not able to benefit financially from making layoff announcements.

Marciukaityte et al. (2006) investigate how revealed announcements regarding corporate fraud affected companies' market value over the period of 1978-2001 in the US. They analyze 276 accusations of fraud, such as financial reporting frauds and regulatory violations. According to the results, the corporate fraud announcement generated significantly negative reactions in the short-term. The two-day average of abnormal returns was -5.01 percent on cumulative basis. They also conclude that by improving the internal

control systems, companies are able to repair the lost reputation and gain investors' trust back.

Farber & Hallock (2009) contribute to the existing studies regarding market reactions by analyzing the connection between job loss announcements over the period from 1970 to 1999. They state that the average market reaction over the period has been -0.315 percent. Furthermore, they find evidence that the market reaction has changed over time and become less negative. However, they are not able to identify the reasons behind this change. They assume that it can be explained by the fact that layoff announcements are not always signs of corporate problems or negative news for the investors.

Guidry and Patten (2010) examine the effects of the first-time announcement of the release of sustainability reports in the United States in 2001-2008. They also analyze whether the quality of the reports explains the differences in market reactions. According to the results, the first-time releases of sustainability reports did not significantly impact market value. However, they learned that the reactions varied according to the quality of the report, meaning that the market reactions were more favorable for high-quality sustainability reports than for lower quality reports. They conclude that if a company is willing to gain reputation via engaging in sustainable reporting, reporting itself is not enough, but it should also be of high-quality.

Cheung (2011) examines the relationship between 60-day returns of US stocks and announcements of exclusions and inclusions of the Dow Jones Sustainability World Index. He studies the relationship by performing an event study over the sample period from 2002 to 2008. According to the study, no strong evidence was found that the event announcements would have a significant impact on stock returns or risk. He states that the event announcement does not bear information and that any shifts in demand are only temporary. However, he mentions that some evidence of temporary but significant impact was found on the days around.

Flammer (2013) examines how the market reacts to news announcements regarding corporate environmental behavior. She conducted the study for publicly traded companies in the US and analyzed the data over the period of 1980-2009. The market reaction was positive in case of positive announcements regarding the environment. Similarly, when negative news announcements are announced, the reaction is negative. The results also

indicate that the more environmentally-friendly behavior is institutionalized as the norm, the more companies are penalized over harmful behavior. In other words, companies are penalized if they do not follow the norm. She also states that the negative reactions to harmful behavior have become stronger over time. In contrast, the positive reaction to environmentally friendly behavior has decreased over time, indicating that environmentally friendly activities have decreasing marginal returns.

While Flammer examined announcements regarding the environment, Jory et al. (2015) focus on the economic and social factors. Jory et al. analyze the market responses on 80 corporate scandals involving CEOs of publicly listed companies in the US. The study is conducted for events announced within the period of 1993 and 2011, including both financial and non-financial scandals, such as accounting fraud, investment fraud, and sexual harassment. The results indicate that the market reactions to corporate scandals were significantly negative in the short run. They also find that large companies are often more sensitive to corporate scandals, especially if the companies have insiders as board members and if their managers are rewarded by a substantial value of options.

Krüger (2015) contributes to the research of sustainability by studying the short-term market reactions to negative and positive news announcements regarding corporate social responsibility in the US. He performs the study for 2116 news announcements related to CSR events for the period from 2001 to 2007. He observes strongly negative investor reactions towards negative CSR news announcements. He states that the reaction is even more negative in the case of news regarding the environment and communities. The reactions to positive news announcements are also negative, but just slightly. Hence, he argues that investors in the US do not value initiatives regarding CSR. He also finds evidence that investors' reactions are more intense when news announcements have strong legal or economic content.

Capelle-Blanchard and Petit (2019) analyze approximately 33 000 news from 2002 to 2010, both positive and negative, related to ESG issues of the world's largest multinational listed companies. The dataset of ESG news announcements consists of extreme events as well as very common events. The results show that in the case of negative ESG news announcements, the change in the market value of the company on a window from day -1 to +1 is about - 0.1 percent, whereas the change in value is hardly significant when the EGS news announcement is positive. Thus, they conclude that it appears that shareholders are

punishing companies for irresponsible behavior, but the responsible behavior is not recognized.

3.4 Summary of previous studies

The existing literature on the stock value and sustainability-related events focuses mainly on events regarding index inclusions and exclusions, ratings, or individual events regarding sustainability-related announcements as news articles about environmental violations or market reactions on corporate sustainability reports. Also, many studies focus on other concepts than corporate sustainability, such as corporate social responsibility and ESG. These are all, however, closely related to the CS.

Table 1 presents a summary of the existing studies mentioned in previous subsections. In total, 17 previous studies are reviewed. The table lists the authors and the event types. Event types are divided into negative and positive events, which are further divided into three sub-categories; Economic (Ec), Social (S), and Environmental (E). The table also presents the main demographic factors and relevant results in terms of this study.

Overall, three studies focus on European markets and the other three on Asian markets, while the rest of the studies focuses on other regions, mainly in the US. Most of the studies conducted for the other regions indicate negative cumulative average abnormal returns for negative announcements regarding CS related events. As for Europe, there are more mixed results. However, it must be noted that only a few studies exist for Europe. The results indicated negative or insignificant market reactions. In contrast, in Asian markets, the results indicate that CS-related activities are not valued and are even penalized. Thus, it seems that in Asia, corporate sustainability is valued differently than in Europe or, for example, in the US.

Table 1. Summary of the previous research: Short term market reactions.

Authors	Event	Region	Num. of events	Period	CAAR	Result
Elayan et al. (1998)	Negative: S	Not specified	646	1979-1991	+	No significant impacts
Hallock (1998)	Negative: S	US	1287	1987-1995	-0.007%***	Small but significantly negative impacts
Marciukaityte et al. (2006)	Negative: F	US	276	1978-2001	-5.01%*	Negative ARs
Consolandi et al. (2008)	Negative Positive	Europe	95 113	2002-2006	-0.08%** 0.059%**	Negative ARs shortly before and after a negative event. Positive ARs shortly before and after a positive event
Fernandez-Izquierdo et al. (2009)	Negative Positive	Spain	73 83	1997-2002	+	No significant impacts
Farber et al. (2009).	Negative: S	US	4273	1970-1999	+	Negative ARs
Guidry et al. (2010)	Positive	US	37	2001-2008	-0.1690%	No significant impact on market value. More favorable reactions to high-quality reports
Cheung (2011)	Negative Positive	US	97 80	2002-2008	+ +	Some temporary impacts in the short term
Cellier et al. (2011)	Positive	Europe	1588	2004-2009	2.81%*	Positive ARs for all ratings
Xu et al. (2012)	Negative: E	China	57 companies	2010	+	Slightly negative ARs
Flammer (2013)	Negative: E Positive: E	US	156 117	1980-2009	-0.65%** 0.84%**	Negative ARs for negative events. Positive ARs for positive events
Cheung et al. (2013)	Negative Positive	Asia Pacific	75 103	2002-2010	+ +	Significant and negative impacts for both negative and positive events
Jory et al. (2015)	Negative: F & S	US	80	1993-2011	+	Significant and negative ARs
Krüger (2015)	Negative Positive	US	1542 574	2001-2007	-1.31%* -0.47%*	Strong negative impact on negative events. Negative but not significant impact for positive news
Li et al. (2017)	Positive: E	China	1595	2008-1016	-0.46%*	Negative ARs. Less significant day after the event
Capelle-Blancard et al. (2019)	Negative Positive	Global	10 676 22 391	2002-2010	-0.139%** 0.035%**	Negative ARs for negative events. No significant impact on positive events

Significance level: *1%, **5%. Several relevant results or some other methods are used: + (See source for more info). Event type: Economic= F, Environmental= E, Social= S.

4. Data

In this chapter, the empirical data, data sources, and data selection criteria will be presented and described. The corporate sustainability-related news articles are divided into three categories, and the daily stock prices of chosen companies are gathered. The event data and stock market data are described in the following subsections.

4.1 Characteristics of the event data

The event data of this study consist of news articles collected from various sources. The articles are collected case by case from reputable online publications that are published in English. The news gathering process is performed using the news selection criteria in Table 2 and by performing searches with the keywords listed in the “Search terms” section. The keywords are entered into online publications’ search engines, and suitable news articles are selected from the search results. In this case, “suitable” means that the article meets all the requirements listed in the news selection criteria. From the suitable articles following information is gathered: Company name, Exchange, Date of publication, Name of the publication, and Source.

All collected news articles related to corporate sustainability are collected for a period of ten years from January 1st 2010 to December 31st 2019. In this thesis, instead of actual event dates, the publication dates are used. The aim was to find the initial announcements of the events, as presumably, the market reactions are strongest to the first announcements. The requirements for the articles are that they must be published by publishers that have vast distribution and that news articles are significant in terms of the reputation of the companies. The requirements are justified by the assumption that these types of publications are likely to have reached the majority of investors and may, therefore, affect share prices. Also, if prestigious publishers published the news, the news is expected to be significant. Another requirement for the news articles is that the selected articles are written about listed companies listed either in Europe or Asia, to enable examining market reactions.

According to the concept of corporate sustainability, news articles are collected for three categories: economic, social, and environmental. No similar study had been conducted before; thus, the news criteria is created by comparing other existing reviews and by studying related literature to find out what type of keywords could be used. For instance, keyword ideas for the social category were partly collected from the article written by Panapanaan, Linnanen, Karvonen & Phan (2003). In their study, they presented a roadmap for corporate social responsibility in Finnish companies and listed various social management areas, such as discrimination and child labor. Ideas for the environmental category were collected from an article by Islam & Islam (2011), who studied environmental incidents and corporate environmental disclosures. They named different environmental incidents, such as chemical leaks and oil spills. Also, the article “An analysis of indicators disclosed in corporate sustainability reports” written by Roca and Searcy (2012) were used in the keyword brainstorming process.

In this study, news announcements regarding layoffs and job cuts are used as indicators of unsustainable behavior. However, as already mentioned in the literature review, these events do not always indicate unsustainable behavior. For example, Farber and Hallock (2009) argue that layoff announcements are not always signs of corporate problems and might be a sustainable decision. Also, these types of announcements are not always negative news for investors. Therefore, it should be noted that using these events as indicators may impact results and may not give an accurate representation of negative impacts on the social category.

Table 2. Selection criteria for the newsgathering process.

Published:	January 1 st , 2010- December 31 st , 2019	
Sources:	Reputable online publications published in English	
Requirements:	Publicly listed companies in European or Asian stock exchanges	
Search terms:		
	Unprofitable	Profits overstatement
Economic:	Unsustainable debt/investment	Embezzlement
	Audit investigation/fraud	Money laundering
	Accounting scandal/fraud	Insider trading
	Tax fraud/probe	Protest vote
Social:	Layoffs/ Job cuts	Child/forced labor
	Strike	Harassment/discrimination
	Greenwashing	Toxic/hazardous/chemical
Environmental:	Environmental violation	emission/waste/spill/leak/explosion
	Air/water pollution	Oil spill
	Contamination	Illegal deforestation

The event data sample consists of a total of 209 news articles related to corporate sustainability. The sample is divided evenly between the two regions: Europe and Asia. The sample of Europe consists of 105 news articles, and the sample of Asia includes 104 news articles. These are further divided into three categories: Economic, Social, and Environmental. The relative division between the categories is shown in Figure 5.

The target was to collect around 50 news articles from each category. However, some extreme events had to be excluded from the data sample. The economic category consists of 37 news articles regarding Europe and 38 news articles regarding Asia. The category includes news articles about, for instance, profitability, compliance, and corporate governance. The news articles from this category were relatively easy to collect compared to the other categories. The social category includes 42 news articles from Europe and 41

news articles from Asia. Most of the news from this category are announcements about layoffs or job cuts, which are relatively common incidents of companies.

The environmental category includes fewer news articles in both regions compared to other categories. As for the other categories, the aim was to collect around 50 news articles, but news articles in this category are the most challenging to find. In general, a lot of news about environmental events are published, but a limited number of events about environmental violations are reported. Lyon and Maxwell (2011) argued in their study that this might be due to the fact that managers always prefer to minimize the number of violations reported and that only successes are reported. If withholding information is not penalized, then full disclosure of the information is not the equilibrium strategy for the companies.

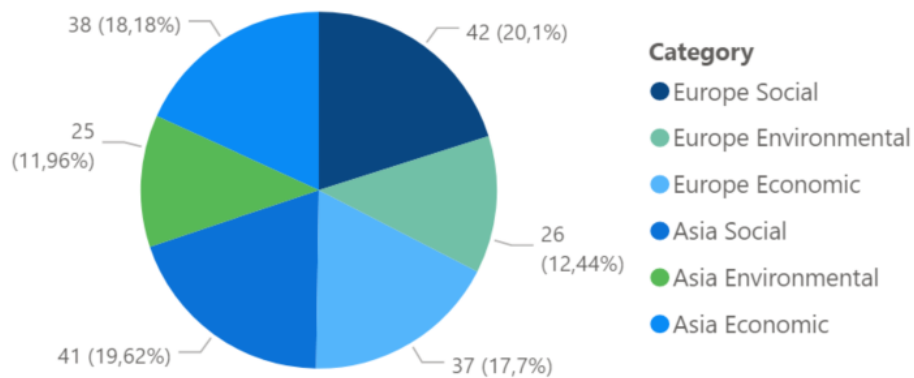


Figure 5. Relative division of the news articles between the categories.

In total, articles are gathered from 21 different sources. In Figures 6 and 7 all the publishers are named, and the numbers of news articles included from each publisher are represented. The aim was to collect the news articles from the most prestigious publishers, but also some other well-known sources were used. The most used source was The Financial Times.

The majority of the news about Europe are gathered from the Financial Times, which represents 70 % of the news articles collected. The second most used source was The Guardian, which represents 15 % of the European news articles collected. In most cases where the Financial Times was not used, it is because another publisher made the initial announcement.

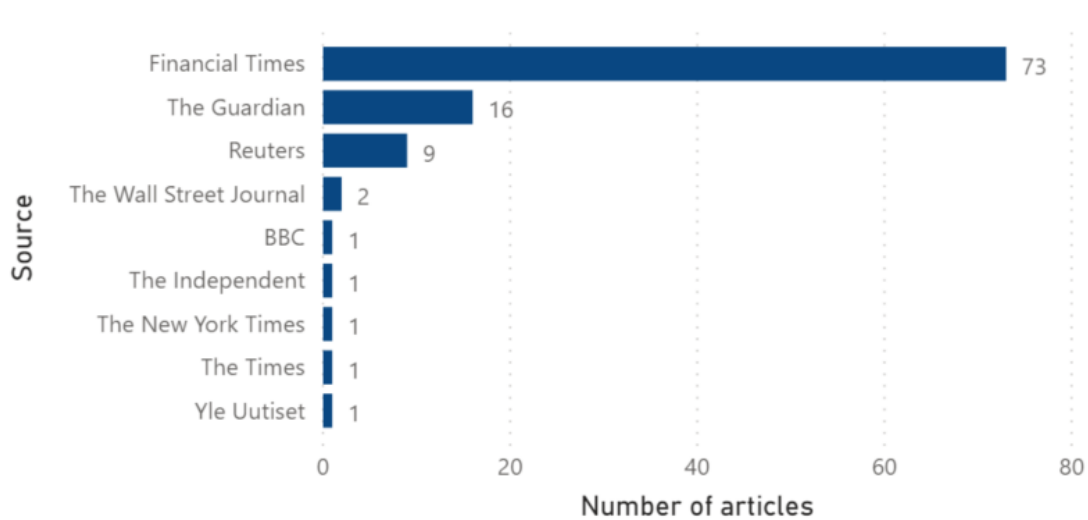


Figure 6. The division of news articles by publisher in the European region.

In the case of Asia, the division of publishers is more fragmented. Most of the news articles are gathered from six different sources. Four of those are well-known Asian publishers. The Financial Times was also used to collect news articles about Asia, but because The Financial Times concentrates mostly on Europe and the United States, also other sources were used. Also, since the aim is to examine the reactions of the Asian markets, it can be assumed that Asian publishers may reach the investors, if not better, then at least accordingly.

The majority of news is collected from well-known Japanese publisher Nikkei Asian Review, which represents 23 % of the news articles collected. The second and third most used news source is Reuters with a share of 14 %, and the Korea Times, with 13 % of the news articles collected. Also, Financial Times, the Indian publisher The Economic Times, and the Hong Kong publisher The South China Morning Post are widely used, accounting for 33 % of the total number of included news announcements.

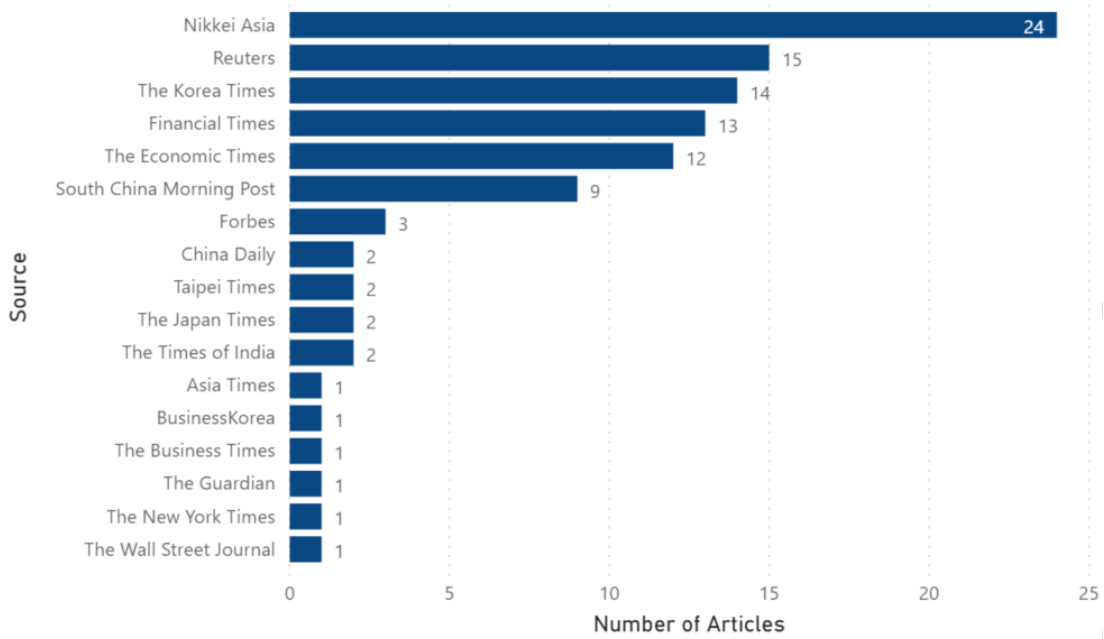


Figure 7. The division of news articles by publisher in the Asian region.

All the articles are published within the period of 2010-2019. Most of the news about European companies is published at the end of the decade: Figure 8 shows that 38 articles (i.e. 36 %) of the news articles are published in 2019.

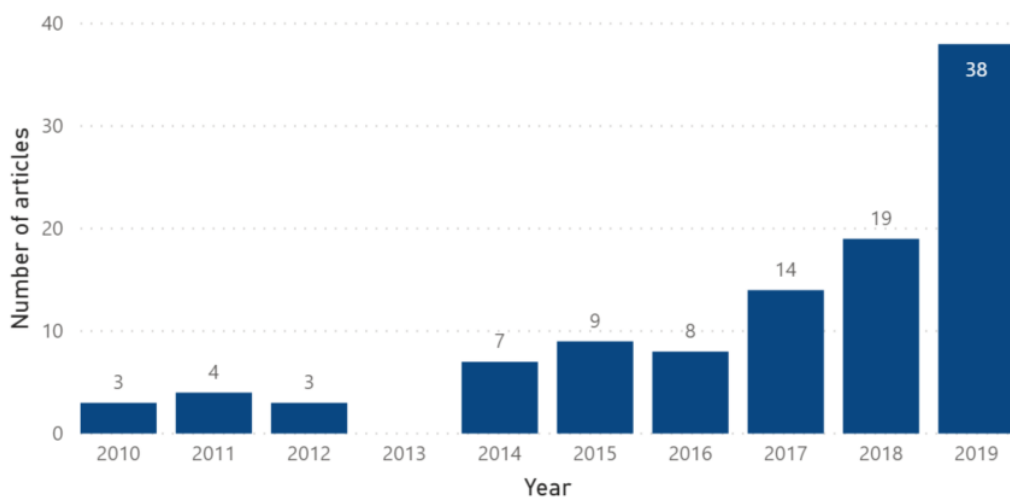


Figure 8. Division of the news articles by publishing year in the European region.

In the case of Asia, the division between years is more fragmented, but still, the focus is on the end of the decade. According to Figure 9, 31 news articles were published in 2019 and 19 in 2018. Thus, 30 % of the news was published in 2019 and 18 % in 2018.

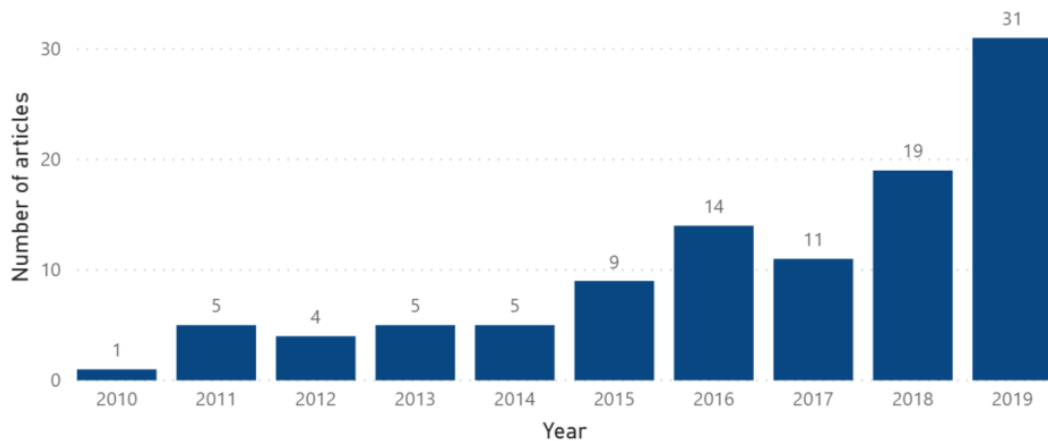


Figure 9. Division of the news articles by publishing year in the Asian region.

As stated before, in this study, in total, 209 news articles were collected from companies listed in Europe and Asia. As the amount of listed companies is limited, some of the companies are included more than once in the data but for different categories. Thus, it should be noted that the number of news articles does not equal the number of listed companies. All the companies that were included in this study were listed on either the European or Asian stock markets at the time of the news release.

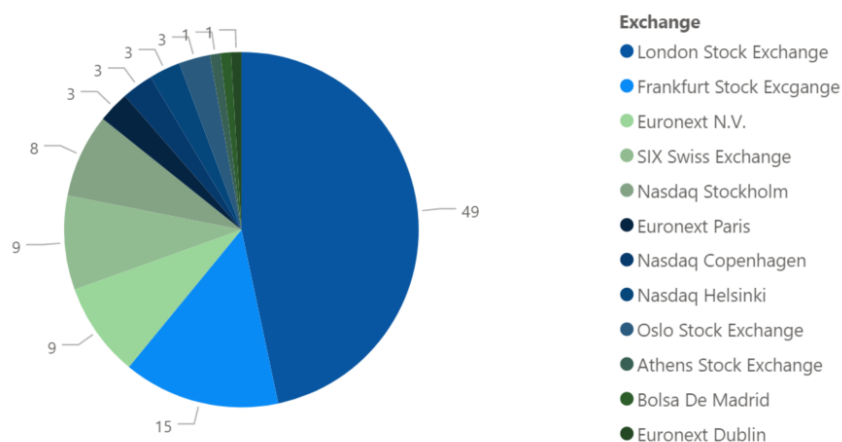


Figure 10. Division of the news articles between the stock exchange of listing in the European region.

In Figure 10 shows the division of the news articles between stock exchanges in Europe. 47 % of such articles are about companies that are listed on the London Stock Exchange. Another notable exchange is the Frankfurt Stock Exchange, which accounts for 14% of the European sample of news articles. In total, the sample data considers 12 stock exchanges.

Figure 11 illustrates the division of the news articles in Asian stock exchanges. In total, 10 Asian stock exchanges are included in this study. Most of the companies were listed in the Tokyo Stock Exchange, which gets the coverage of 35 % of the news articles. The second and third most news announcements are related to the companies listed in the Korea Exchange (20 %) and the Stock Exchange of Hong Kong (12 %).

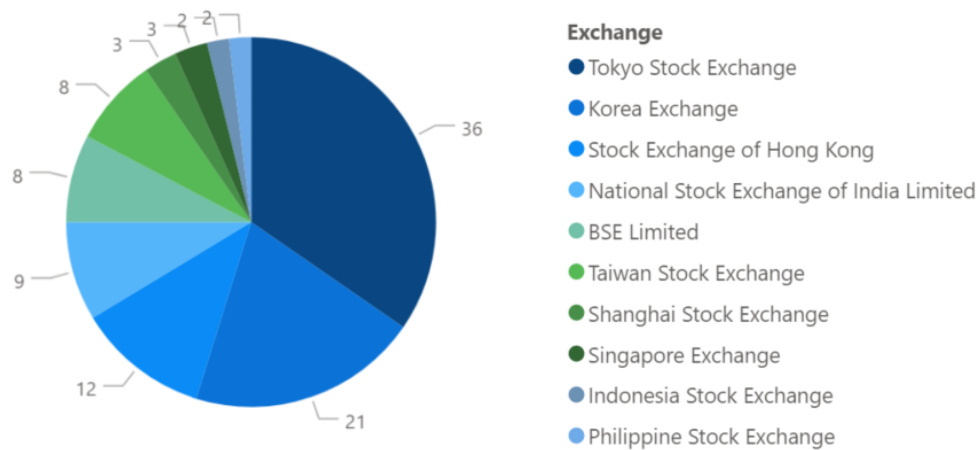


Figure 11. Division of the news articles between the stock exchange of listing in the Asian region.

The official names may have changed during the time period due to mergers and acquisitions. In this thesis, the stock exchanges are presented by their current official names. All the companies included in this study and their stock exchange of listing are listed in Appendix 1, which also presents all company- and event-specific information.

4.2 Stock return and market return data

The daily stock market data, including stock price data and the market return data, was collected from the Thomson Reuters DataStream. In this study, market proxies were selected for each stock according to each company's domicile stock exchange. For example, for the stocks listed on the London Stock Exchange, the FTSE 100 Index is used as a market proxy, whereas for the companies listed on the Tokyo Stock Exchange, the Nikkei 225 index serves as a market proxy. In order to measure the returns of the stocks and market returns, logarithmic returns were calculated. Logarithmic returns were calculated with the following formula:

$$r_t = \ln \left(\frac{P_t}{P_{t-1}} \right) \quad (1)$$

, where r_t is the logarithmic return of an asset at time t , P_t the value of the asset at time t , and P_{t-1} the value of the asset at time $t-1$. (Campbell 1997 11) The logarithmic returns are widely applied, particularly in time-series analyses. By using logarithmic returns, the effect of any skewness in the distribution of the returns is reduced.

5. Research methodology

The purpose of this study is to examine the short-term effects of sustainability-related news announcements on stock prices. In order to measure the stock market reaction, the widely applied event study methodology is used. The methodology is commonly used in accounting and finance research and has many different applications (MacKinlay 1997).

Event studies use financial market data to measure how a specific event affects the value of a firm (MacKinlay 1997). In other words, event studies measure the impact of unanticipated events on stock prices. The impact is measured by calculating abnormal returns, which indicate the reactions of shareholders to the new information. Abnormal returns are derived by subtracting the expected return of the stock from the actual return. (Hawn, Chatterji & Mitchell 2015) The methodology assumes that, in rational markets, information regarding the event is immediately reflected in stock prices. (MacKinlay 1997)

In this study, the methodology and equations mostly follow MacKinlay's (1997) research on the applicability of the event study methodology. According to MacKinlay, no unique structure exists for event studies, but usually, the studies follow a similar flow of analysis. The process of conducting an event study begins with defining the event and event window over which the stock prices are examined. (MacKinlay 1997) In this study, the events are news announcements regarding negative sustainability-related incidents concerning different companies.

According to MacKinlay (1997), the event window is usually larger than the actual period of interest, which allows studying the days around the event day. Often multiple days are included in the event window. In this study, the events are examined in four different windows. The first two shorter windows are three [-1, +1] and 11 [-5, +5] days long, and the two longer windows are 21 [-10, +10] and 41 [-20, +20] days long. The event windows examined in this study are illustrated in Figure 12.

When the event has been identified, selection criteria must be determined, which includes determining the criteria for the company selection process. The selection criteria may include different restrictions, such as listing on certain stock exchanges. (MacKinlay 1997) The main criteria in this study is that a company has faced a sustainability-related incident which has

been published as news. The selection criteria defined for this study are presented in Table 2.

After defining the selection criteria, the method for calculating abnormal returns must be determined. In order to calculate the abnormal return, the normal return must be defined, which is the return that an investor could expect to achieve if the event did not take place. The abnormal return can then be calculated by subtracting the normal return from the actual return of the stock. For company i and the event date t the abnormal return is calculated using the equation below. (MacKinlay 1997)

$$AR_{it} = R_{it} - E(R_{it}|X_t) \quad (2)$$

In the equation, AR_{it} is the abnormal return, R_{it} is the actual return of a stock, and $E(R_{it}|X_t)$ is the expected normal return. (MacKinlay 1997) The modeling of normal return is specified in the next subsection. Similarly, the aggregation of abnormal returns is presented later in section 5.2.

The next step after defining the abnormal return and the normal return is to choose the estimation window. According to MacKinlay (1997) the period prior to the event is often used as the estimation window. Also, in general, the estimation window and event window do not overlap. In this study, the chosen length of the estimation window is 90 trading days, starting from 120 days prior to the event. A similar structure of estimation window was used, for instance, by Xu et al. (2012). The estimation window and event window are specified in Figure 12.

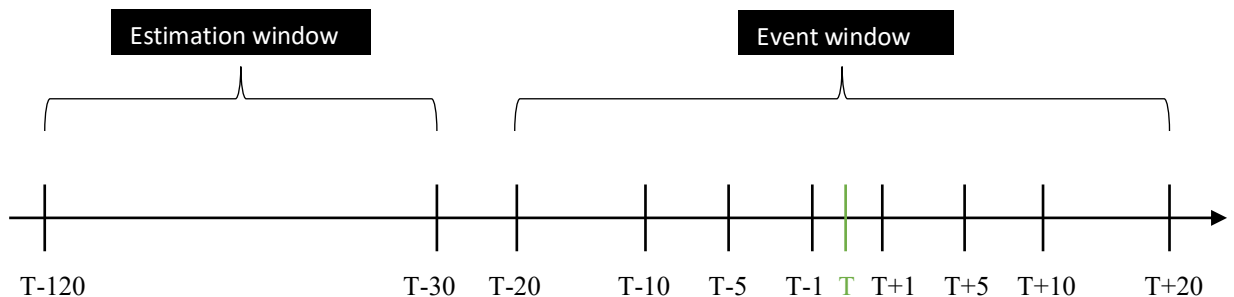


Figure 12. Estimation window and event window.

5.1 Modeling the normal return

In order to calculate the abnormal return, the normal return must be determined. The normal return is the hypothesized expected return in case the event did not take place. According to MacKinlay (1997), there are various models that can be used to calculate the expected return. He names two widely used methods for modeling the expected return – the market model and the constant mean return model.

In this thesis, the market model approach is applied to estimate the normal return of each stock. Brown and Warner (1985) propose that the market model generates accurate results compared to other methods. Additionally, Armitage (1995) argues that previous research confirms that the market model performs significantly better when compared to other related methods.

The market model is a statistical model that presumes that a stable linear relationship exists between the market return and the stock return. (MacKinlay 1997) The market model is derived from a well-known model, the Capital Asset Pricing Model (CAPM) (Armitage 1995). The formula of the model based on which pre-event alphas and betas are estimated is as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \quad (3)$$

$$E(\epsilon_{it}) = 0 \quad \text{var}(\epsilon_{it}) = \sigma_{\epsilon_t}^2$$

In the equation, R_{it} and R_{mt} are the returns of stock i and the market proxy at the period t . α_i and β_i are the model parameters. ϵ_{it} is the zero mean disturbance term. The expected value of the error term in the equation is 0, and the variance is constant. When the normal return for each stock has been calculated, the abnormal return can be estimated. As presented in Equation (2), abnormal returns can be calculated by subtracting the value of the expected normal return from the stock's actual return. (MacKinlay 1997)

5.2 The aggregation of abnormal returns

In order to study the impact across all the stocks and through time, the abnormal returns must be aggregated. By aggregating the returns, general conclusions can be drawn. In order to measure the impact of an event across time, the cumulative abnormal returns (CAR) can be calculated. Cumulative abnormal returns measure the impact on a single stock within the event window (Campbell 1997, 157-162; MacKinlay 1997). The following formula is used to calculate the CARs:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (4)$$

, where t_1 and t_2 denote the chosen period of the cumulative abnormal returns within the event window. Cumulative abnormal returns from t_1 to t_2 are calculated by summing the abnormal returns from t_1 to t_2 . (Campbell 1997, 157-162; MacKinlay 1997) Since the CARs measure the impact of a single stock, average returns must be calculated. In order to measure the daily impact across all the stocks within the sample, the average abnormal returns (AAR) are calculated. (MacKinlay 1997) Average abnormal returns are calculated using the following formula:

$$AAR_t = \frac{1}{n} \sum_{i=1}^n AR_{it} \quad (5)$$

, where AAR_t is the average abnormal returns on period t , n is the number of events, and AR_{it} is the abnormal returns at the period t . In order to measure the impact for both regions across all the stocks and through time, cumulative average abnormal returns (CAAR) must be calculated. (MacKinlay 1997) CAARs are calculated with the following formula:

$$CAAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AAR_t \quad (6)$$

, where $CAAR(t_1, t_2)$ is the cumulative average abnormal return within the time period from t_1 to t_2 . AAR_t is the average abnormal return in period t . The cumulative average abnormal return measures the impact of the event announcements on the values of the included stocks. Event announcement has an impact on the stock return if the abnormal returns are statistically significant. (Campbell et al. 1997, 157-162; MacKinlay 1997)

5.3 Statistical testing

Brown and Warner (1980, 1985) examined the probability and reliability of different statistical tests for the null hypothesis rejection. They consider the parametric t-test to be the most appropriate when testing statistical significance in the case of event study methodologies. (Brown et al. 1980, 1985) Similarly, Berry et al. (1990) state that when using daily returns and parametric t-test, the sampling distribution is well specified compared to nonparametric tests. In their research, they recommend using a t-test instead of nonparametric tests and urges caution if nonparametric tests are used. The parametric t-test is widely used in event studies, including this thesis.

In order to be consistent with the methodology used in this thesis, the statistical testing will follow the framework of Campbell et al. (1997, 160-162) and MacKinlay (1997). With the parametric t-test, the null hypothesis that event announcements have no impact on the variance or the mean of the returns, can be tested. (Campbell et al. 1997, 160-162) The statistical significance for average abnormal returns is calculated with the following formula:

$$\theta_1 = \frac{AAR_t}{\sqrt{\sigma^2(AAR_t)}} \sim N(0,1) \quad (7)$$

, where AAR_t is the average abnormal return at period t and σ^2 is the variance. The variance of the average abnormal returns is calculated with the below-presented formula:

$$\sigma^2(AAR_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{\varepsilon_i}^2 \quad (8)$$

In the formula $\sigma_{\varepsilon_i}^2$ is unknown, and thus, to calculate the variance, an estimator must be applied. (MacKinlay, 1997) According to MacKinlay (1997), the usual sample variance measure from the estimation window is an appropriate estimator. For the cumulative average abnormal returns, the null hypothesis can be tested using the following formula:

$$\theta_1 = \frac{CAAR(t_1, t_2)}{\sqrt{\sigma^2(CAAR(t_1, t_2))}} \sim N(0,1) \quad (9)$$

In the formula, $CAAR(t_2, t_1)$ is the cumulative average abnormal return within the time period from t_1 to t_2 , and σ^2 is the variance. The variance is calculated based on the $\sigma^2(AAR_t)$ as follows (MacKinlay 1997):

$$\sigma^2(CAAR(t_1, t_2)) = \sum_{t=t_1}^{t_2} \sigma^2(AAR_t) \quad (10)$$

5.4 Critics of the event study methodology

Although event study methodology is widely used, there are problems with the methodology. For instance, Wells (2004) criticizes the functionality of the beta used in the market model as an indicator of future variability. In the market model, it is assumed that beta is constant and that the previous performance is a perfect indicator to predict the future. He argues that empirical tests prove that, despite the assumption, beta is not constant over time.

Another problem with the methodology lies in the assumption that the identification of the event date can be made with certainty. MacKinlay (1997) argues that in some studies, it can be hard to identify the exact event date. He states that, for example, when event announcement dates are collected based on news publication dates, one cannot be certain whether the information has already reached the markets. If markets are informed prior to the news announcement, the exact event date differs from the publication date. Thus, expanding the event window to multiple dates should be applied.

The methodology also assumes that irrelevant factors (white noise) affecting stock prices can be filtered away. When filtering is done successfully, the remaining data represents the impact of the specified event solely. White noise can be minimized, for example, by using a large sample size, by selecting sample companies from different industries, or when the event dates differ from one another. However, unsuccessful filtering of the data may lead to erroneous conclusion. (Wells 2004)

6. Research hypotheses

The main objective of this study is to examine market reactions to negative corporate sustainability news announcements. The study focuses on two regional markets: Europe and Asia. The market reactions are compared between the two markets. The news is then further divided into three categories according to the news topic: economic, social, and environmental. Moreover, the results of these categories are then compared in both markets. The research hypotheses are constructed according to the theory and given the research material.

MacKinlay (1997) determines that the null hypothesis of event studies is that events do not have a significant impact on stock prices. According to the semi-strong form of the efficient market hypothesis, when new information is announced, the information is immediately incorporated into stock prices (Fama 1970). Therefore, after negative news announcements, an immediate market reaction should appear. As many previous studies have proven negative market reactions to negative sustainability news (Cheung et al. 2013; Krüger 2015; Capelle-Blancard et al. 2019), the first two counter-hypotheses to the null are formulated as follows:

H1: News regarding corporate sustainability-related incidents have a significant impact on stock returns in Europe.

H2: News regarding corporate sustainability-related incidents have a significant impact on stock returns in Asia.

The third hypothesis considers the differences between the two markets. In general, market reactions may vary across different regions. Previous studies suggest that due to different market conditions and expectations, the markets tend to react more dramatically in developed countries compared to developing countries (Xu et al. 2012; Lo et al. 2018). Thus, the hypothesis is as follows:

H3: The market reaction within the event window in Europe is more negative and more significant than in Asia.

Several studies suggest that investors may overreact to the news in the short-term and that temporary shocks may appear (Fama 1997; De Bondt & Thaler 1985). According to Fama (1997), anomalies are fragile in the long-term and thus tend to disappear quickly. Hypothesis 4 is formulated accordingly:

H4: The overall effects of news announcements disappear soon after the event date within the event window.

According to Krüger (2015), when news releases have strong legal and economic content, investors tend to react more dramatically. Since many of the indicators in the economic category are illegal actions, like frauds, money laundering, and insider trading, the companies under these allegations, if true, are very likely to face financial penalties and losses that affect companies' future. Moreover, because investors value stocks mostly based on the company's financial performance, the reactions will also be stronger when financial consequences are more likely. For these reasons, the final hypotheses are formulated as follows:

H 5: The market reaction is greater and more significant for news related to economic incidents and weaker and less significant for social and environmental incidents in Europe.

H 6: The market reaction is greater and more significant for news related to economic incidents and weaker and less significant for social and environmental incidents in Asia.

7. Empirical results

The empirical results of the study are presented in this chapter. The analysis is divided into three sections. In the first section of the analysis, the effects of negative news announcements are examined throughout the entire sample. The effects on the European and Asian markets are compared. The second section presents the effects of negative news announcements, further divided into three categories according to the news category; economic, social, and environmental. Also, the results in Europe and Asia are compared. In the last part, the bottom five news announcements ranked according to CARs are reviewed for both markets.

7.1 Overall market reactions in Europe and Asia

In table 3, the average abnormal returns for the entire news sample are presented for the 11-day event window (-5, 5) divided into Europe and Asia. On the event day in both markets, Europe and Asia, the returns are significantly negative. In Asia, the market reaction is significantly negative around the event date, but the significant effect seems to disappear soon after the event date. Two days after the event, the reactions are even positive, although insignificantly, but turn back negative on the third day after the event.

In the case of Europe, the results indicate that there have been significantly negative market reactions two days prior to the actual event date on days $t-4$ and $t-2$. Thus, the initial reactions have occurred before the publication of the news articles. Accordingly to Fama's study (1970), the significant decline in stock prices prior to the event day may prove that the information has been already incorporated into the stock prices and that the information regarding the incidents has already leaked to the investors via other information sources, like internet or some investor channels.

Table 3. Average abnormal returns in the 11-day window in Europe and Asia.

Event window	Europe		Asia	
	AAR	t-value	AAR	t-value
-5	-0.0085 %	-0.0507	0.0973 %	0.4348
-4	-0.3536 %	-2.0997**	-0.0874 %	-0.3910
-3	0.0277 %	0.1647	-0.0619 %	-0.2769
-2	-0.7335 %	-4.3555***	0.3301 %	1.4757
-1	0.0437 %	0.2595	-0.6104 %	-2.7291***
0	-1,4271 %	-8.4745***	-0.7418 %	-3.3165***
1	0.0807 %	0.4791	-0.4829 %	-2.1589**
2	-0.0703 %	-0.4173	0.1009 %	0.4509
3	-0.3803 %	-2.2584**	-0.0614 %	-0.2746
4	0.1612 %	0.9570	-0.1670 %	-0.7468
5	-0.0608 %	-0.3609	-0.2540 %	-1.1355

Significance level: ***1%, **5%, *10%.

The market reaction is positive right around the event day but turns negative two days after the event date. The rise in stock prices right after the event date may indicate an increase in demand due to possible underpricing of the stocks after the negative reaction on the event date. This demand may have caused the rise in a stock price. On the third day, the market reaction is again significantly negative at a 5% significance level. The post-event significant market reaction at day t+3 (-0.3803 %) may indicate that there might have been a delay with the information. In other words, investors may have received additional information after the event date that has caused a further decline in the stock prices.

The results presented in Table 3 suggest that the first two null hypotheses can be rejected. Thus, the results support hypotheses 1 and 2, that the news regarding corporate sustainability-related incidents does have a significant impact on stock returns in Europe and in Asia. Also, the results support hypothesis 3 that the market reaction in Europe is more negative and more significant than in Asia. In Europe, the market reaction was significantly negative on four days on the 11-day event window, whereas the reaction in Asia was significantly negative on three days. Similarly, on the event date, the stock prices declined

on average by -1.4271 % in Europe, whereas in Asia, the comparable decrease was -0.7418 %.

Table 4 presents the cumulative average abnormal returns in four different event windows: -1 to +1, -5 to +5, -10 to +10 and -20 to +20. According to the results, the returns in Europe are significantly negative within each event window. The findings are consistent with the results observed from Table 3 and thus further support hypothesis 1 that a significant negative impact on stock prices exists. Similarly, the findings further support hypothesis 2 that news regarding corporate sustainability-related incidents does have a significant impact on stock returns in Asia. In the case of Asia, the returns are significantly negative on three event windows: [-1,+1], [-5,+5], and [-10,+10].

The findings that corporate sustainability-related incidents have a significantly negative impact on stock prices are consistent with previous studies (Capelle-Blancard et al. 2019; Krüger 2015). The results of Consolandi et al. (2008) are similar to the results achieved in this study regarding news announcements in Europe. As in this study, Consolandi et al. (2008) found significantly negative abnormal returns shortly before and after the event date. Furthermore, also the results achieved for Asian markets are consistent with the results of Cheung et al. (2013). They also found a significant and negative impact on stock prices after a negative corporate sustainability-related announcement.

In the case of Asia, the returns on [-5,+5] and [-10,+10] are significant at the 5 % level and thus less significant compared to equivalent returns on the same event windows in Europe. Also, in Asia, there are no significant market reactions within the [-20,+20] event window. Thus, the findings also further support hypothesis 3 that the market reaction in Europe within the event window is more negative and more significant than in Asia. This is consistent with previous studies (Lo, Tang, Zhou, Yenug, and Fan 2018; Xu, Zeng, and Tam 2012) that investors in different regions may react differently to unsustainable behavior.

Table 4. Cumulative average abnormal returns in Europe and Asia.

Event window	Europe		Asia	
	CAAR	t-value	CAAR	t-value
[-1, +1]	-1.3027 %	-4.4663***	-1,8350 %	-4.7368***
[-5, +5]	-2.7209 %	-4.8715***	-1,9387 %	-2.6134**
[-10, +10]	-3.8537 %	-4.9937***	-2,2681 %	-2.2129**
[-20, +20]	-2.3454 %	-2.1751**	-1,2161 %	-0.8491

Significance level: ***1%, **5%, *10%.

Figure 13 visualizes the daily cumulative average abnormal returns around the news announcements. The returns are presented within a 41-day event window. The figure shows a steep decline in stock prices shortly before the news announcements that continue to decline temporarily.

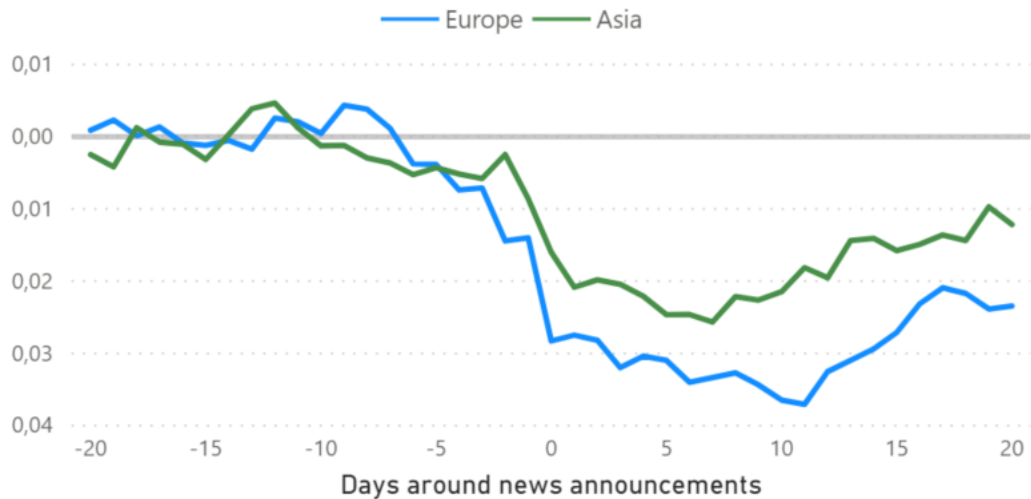


Figure 13. Cumulative average abnormal returns around announcements in Europe and Asia.

As illustrated, the plunge in stock prices is more significant in the case of Europe. Similarly, the recovery after the plunge is slower in the case of Europe. The recovery starts after the

day t+10, whereas in the case of Asia, the recovery starts already after the day t+5. These results support hypothesis 4 that the overall effects of news announcements seem to attenuate after the event date within the event window. Thus, the impacts on stock returns may be only temporary. These findings are consistent with the research performed by Consolandi et al. (2008). According to their results, the impact after a negative event is temporary, and thus, the impact is limited. However, it should be noted that the effects are examined on the event window from day t-41 to t+41, and thus it cannot be determined how the returns continue to behave after the day t+41.

7.2 Market reaction across news categories in Europe and Asia

In order to test hypotheses 5 and 6, the effects of news announcements are observed across the different news topics. Tables 5 and 6 compare how the impact in Europe and in Asia is divided between the news categories: economic, social, and environmental. The tables present the cumulative average abnormal returns for four different event windows: t-1 to t+1, t-5 to t+5, t-10 to t+10, and t-20 to t+20.

According to Table 5, in Europe, the stock market reaction is strongest for the negative economic news. The abnormal returns for economic news are significantly negative within each event window. The market reaction is strongest (-7.6057 %) on the event window [-10,+10], but the reaction is more significant on the window from t-5 to t+5 when the cumulative average abnormal return is -6.3035 %.

The negative effect is not as significant for social and environmental categories compared to the economic category. Thus, investors punish companies less when the incident considers social or environmental events. In the social news category, the market reaction is weakly negative around the event date, but the negative abnormal returns during the two narrowest event windows [-1,+1] and [-5,+5] are not statistically significant. However, within the days t-10 and t+10, the decline in stock prices is statistically significant. In contrast, on the 41-day event window, the returns are significantly positive.

For environment-related news announcements, abnormal returns are significantly negative at the 5% level on the days right around the announcements. The results are also significant

within the event windows of [-10,+10] and [-20,+20]. Investors, therefore, require companies to behave in an environmentally friendly manner, at least in the sense that the companies are punished for environmental violations.

Table 5. Cumulative average abnormal returns in Europe – grouped by news category.

Event window	Economic		Social		Environmental	
	CAAR	t-value	CAAR	t-value	CAAR	t-value
[-1, +1]	-2.9258 %	-4.5532***	-0.0424 %	-0.1045	-1.0290 %	-2.5728**
[-5, +5]	-6.3035 %	-5.1230***	-0.5161 %	-1.2709	-1.1839 %	-1.5460
[-10, +10]	-7.6057 %	-4.4737***	-1.2012 %	-2.9577***	-2.7993 %	-2.6455**
[-20, +20]	-6.5484 %	-2.7566***	1.7344 %	4.2706***	-2.9546 %	-1.9983*

Significance level: ***1%, **5%, *10%.

Figure 14 shows the cumulative average abnormal returns around the 41- day event window separately for each news category. As previously stated, the news regarding economic incidents has the most dramatic effect on stock prices, whereas the impact is less significant in the case of social and environmental violations.

In the case of economic events, the stock prices face a steep decline that begins shortly before the event date. The stock prices start to recover approximately at day t+10 but plunge again between days t+15 and t+20. This may indicate that investors may have received more information regarding the incident and that they have internalized consequences for the company.

The figure supports the result that news about environmental violations has a negative impact on stock prices. The figure shows a steady decline in stock prices after the event date. Moreover, the environmental category is the only category that does not show consistent recovery within the event window. Thus, news announcements regarding environmental violations may lead to more long-term losses compared to other categories.

The social category is the only category where the cumulative average abnormal returns seem to turn positive after the event. For other categories, the returns stay negative after the

event within the event window. Approximately after the day $t+10$, the stock prices start to rise steadily. It can be observed that the impact is very weak and clearly least significant for news in the social category.

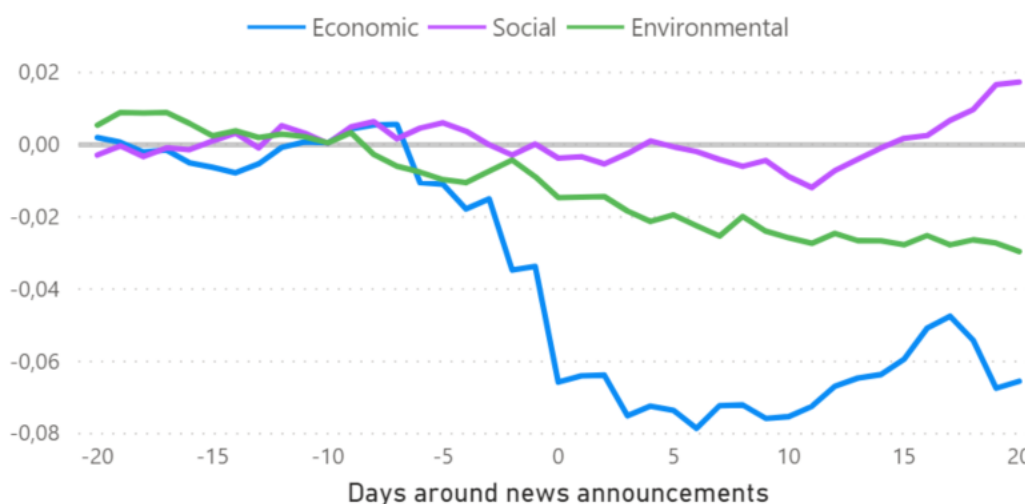


Figure 14. Cumulative average abnormal returns around announcements in Europe – grouped by category.

According to Table 6, in the case of Asia, the economic category is the only category that offers significantly negative abnormal returns. In the other two categories, the returns are weakly negative or even positive. The stock market reaction for economic news is strongest on the event windows of $[-1,+1]$ and $[-5,+5]$, within which abnormal returns are significantly negative at the 5% level. Thus, a significant market reaction is timed shortly around the event date. Within the 41-day window, the abnormal returns are insignificant.

The social incidents affect abnormal returns negatively, but the reactions are insignificant within all of the examined event windows. The reaction seems to be strongest within the days $t-10$ and $t+10$. By contrast, within the 41-day window, the cumulative average abnormal returns turn positive though not significantly in statistical sense.

For the environmental category, the cumulative average abnormal returns are insignificantly negative within all the examined event windows. Thus, news regarding environmental violations does not raise any significant reactions amongst investors.

Table 6. Cumulative average abnormal returns in Asia – grouped by news category.

Event window	Economic		Social		Environmental	
	CAAR	t-value	CAAR	t-value	CAAR	t-value
[-1, +1]	-4.0570 %	-5.8464***	-0.5636 %	-0.9091	-0.5427 %	-1.1560
[-5, +5]	-3.7971 %	-2.8576***	-1.0546 %	-0.8882	-0.5637 %	-0.6271
[-10, +10]	-3.2201 %	-1.7539*	-2.4361 %	-1.4849	-0.5455 %	-0.4392
[-20, +20]	-2.7440 %	-1.0696	0.9387 %	0.4095	-2.4274 %	-1.3986

Significance level: ***1%, **5%, *10%.

Figure 15 illustrates the market reactions in Asia over the 41-day event window according to the different news topics. As stated before, in Asian markets, the investors are most affected by the news regarding economic incidents. During the event window, no sharp declines in abnormal returns occurred for stocks in social and environmental categories.

The figure shows that stock prices begin to fall quite radically soon before the event date and start to stabilize shortly after economic news announcements. Between days t+5 and t+10, the stock prices start to recover rapidly. However, slightly before the day t+15, the stock prices fall again for a few days. As mentioned in the case of Europe, investors may have received additional information regarding the incident that may have led to further reaction.

In the case of environmental violations, negative abnormal returns are much less dramatic. The figure shows a small drop in prices right around the event date but is followed by a quick recovery closer to the level before the drop. In addition, Figure 15 does not show a recovery in abnormal returns towards the end of the event window.

According to the same figure, no notable drop appears right around the event date for the social category. Shortly after the event, the abnormal returns begin to decline but only

temporarily. The abnormal returns begin to somewhat rise between the days t+10 and t+15 and turn positive on cumulative basis the day t+15. Therefore, news announcements regarding events in the social category do not generate long-lasting negative abnormal returns.

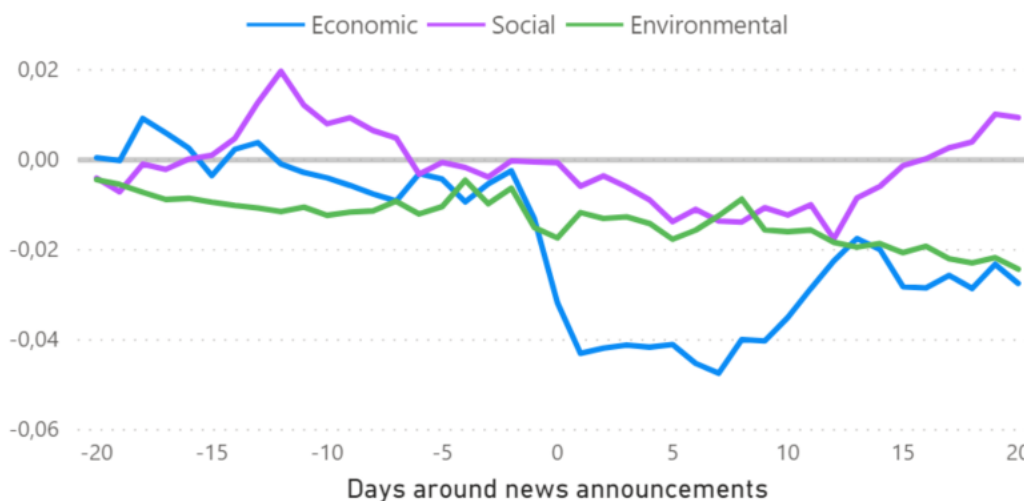


Figure 15. Cumulative average abnormal returns around announcements in Asia – grouped by category.

Altogether, the results presented in this sub-section support the hypothesis that the market reaction in Europe is more significant than in Asia. Furthermore, when looking at the reactions separately by news topic, the findings show that investors in Europe react to the news on all categories, while in Asia, investors react only to economic news.

The results support hypotheses 5 and 6, according to which news with economic content has the most significant impact on stock prices in both regions, Europe and Asia. This is consistent with Krüger's (2015) study that investor reactions are more intense when the news has strong legal or economic content. In both regions, the effects of negative news are statistically significant. However, the impact is even greater within the event window in the case of Europe.

In the case of the social category, both regions had negative cumulative abnormal returns in all event windows, with the exception of [-20, +20,] where the stock prices turned positive for both. In Europe, there are statistically significant market reactions, whereas there are no

significant reactions in Asia. The findings are somewhat inconsistent with previous studies (Elayan et al. 1998; Hallock 1998; Farber et al. 2009). However, as discussed earlier in this study, not all indicators used in this study are necessarily negative news for the investors, which may have caused the results to turn positive (Farber et al. 2009). Moreover, Elyan et al. (1998) argue that investors are often aware of the problems in companies, and therefore layoffs, for example, can be expected. Thus, the information is already incorporated into the stock prices, and the results may not be significant.

For the news related to environmental violations, the reactions were significantly negative in Europe, whereas in Asia, the reactions were only insignificantly negative. Thus, investors of Asian companies do not react to environmental violations as strongly as their colleagues in Europe. The results for Europe and Asia are consistent with previous studies (Flammer 2013; Xu et al. 2012). Xu et al. (2012) argue that the average decline in stock prices in developing countries is much lower than in developed countries. Furthermore, Flammer (2013) states that companies are more penalized for harmful behavior if environmentally friendly behavior is institutionalized as the norm, which is true in Europe but not so much in Asia.

7.3 Bottom five events in Europe and Asia

The aim of this study is to measure the overall market reactions in Europe and Asia to negative news announcements related to corporate sustainability, and not to focus on the impact on one company. In Tables 7 and 8, the news with the most negative impacts is presented to give an overall idea of what type of news is included in the study. The impact on individual companies is measured by a one-day decline in stock prices. The tables include the bottom five events in Europe and Asia according to the largest stock price declines in the 41-day event window. Moreover, the 21-day CAR is presented.

In the case of Europe, Telit Communications experienced the strongest drop in stock prices. The stock price fell by -53.65% on day t-2. Of the bottom five events, four news belong to the economic category. This supports the result that news in the economic category has the greatest impact on stock prices. Moreover, the results support the observation that some information has already reached the investors before the publication of the news in Europe.

Table 7. Bottom 5 news announcements in Europe ranked by the largest stock price declines.

Bottom	Company	Category	Decline	Date	CAR [-10,+10]	News headline	Publication date
1	Telit Communications	Economic	-53.65%	7.8.2017 (t-2)	-99.90%	Telit's Oozi Cats dogged by near-namesake's fraud indictment	09.08.2017
2	Metro Bank plc	Economic	-49.30%	23.1.2019 (t-6)	-38.04%	Metro Bank bosses under fire over accounting error	31.01.2019
3	Ferrexpo plc	Economic	-33.37%	18.4.2019 (t+3)	-30.36%	Data brokers and credit scorers accused of GDPR breaches	23.4.2019
4	Wirecard AG	Economic	-28.79%	1.2.2019 (t-4)	-43.32%	Wirecard: inside an accounting scandal	07.02.2019
5	Norwegian Air Shuttle ASA	Social	-24.19%	24.1.2019 (t-10)	-56.61%	Norwegian hit by strike threats and losses	07.02.2019

Compared to Europe, in Asia, the bottom five news do not cause as strong declines in stock prices. Thus, this also supports the result that reactions are more dramatic in Europe than in Asia. Interestingly, in Asia, the bottom five includes four news from the social category. However, the bottom one news is from the economic category. The stock price of Pou Sheng International (Holdings) Ltd has fallen the most by -25.13% on the event date.

Table 8. Bottom 5 news announcements in Europe ranked by the largest stock price declines.

Bottom	Company	Category	Decline	Date	CAR [-10,+10]	News headline	Publication date
1	Pou Sheng International (Holdings) Ltd	Economic	-25.13%	09.01.2017 (t+0)	-25.00%	Shares of world's largest footwear maker plunge on false sales data	09.01.2017
2	Mitsui E&S	Social	-24.36%	5.11.2019 (t-3)	-28.20%	Shipbuilder Mitsui E&S to sell off assets and cut 1,000 job	9.11.2019
3	Yurun Group Limited	Economic	-22.12%	27.6.2011 (t+0)	-18.01%	Chinese meat firm Yurun plunges on Muddy Waters rumors	27.6.2011
4	Kumho Tire Co., Inc	Social	-17.95%	26.2.2018 (t-11)	-11.10%	Kumho Tire workers to go on strike	13.3.2018
5	Infosys Ltd	Social	-17.66%	22.10.2019 (t+12)	-13.90%	Infosys lays off mid, senior level executives	05.10.2019

As previously mentioned, the most extreme events were filtered out to minimize the impacts of individual deviations on the results. After removing the outliers, no individual event should have a dramatic impact on the results. In order to be certain, it was tested by removing the bottom one events from the calculations. The removal of the bottom one events did not change the results significantly. Moreover, by removing bottom five events the results somewhat changed, but the results remain significant.

7.4 Robustness check

In sub-chapter 5.4, the critics of the event study methodology were shortly reviewed. One of the criticisms considers the stability of the beta. According to Wells (2004), the market model assumes that the beta is constant.

In this study, the stability was tested by performing a robustness check for the beta. The robustness check is executed by changing the pre-event alfa as zero and beta as one for the samples. After reconfiguration, the new results are observed and compared with previous results.

When compared to the previous results, no significant changes in results occur. After the changes in alfa and beta, the results remain significant. Overall, the results after changing the alfa and beta are mostly in line with the main results. The results of the robustness check are presented in Appendices 2, 3, 4, and 5.

8. Conclusions

The purpose of this thesis was to measure and evaluate how markets in Europe and Asia react to negative corporate sustainability news announcements. The study includes 209 negative news announcements regarding publicly listed companies in Europe and Asia from 2010 to 2019. The study is motivated by the growing interest of investors in sustainable investing and corporate sustainability. Therefore, it is topical to research whether investors penalize companies when negative news about their behavior and activities are reported in the media. Moreover, market reactions were examined in Europe and Asia to assess whether the region and different market conditions affect the results. The main objective of this was to answer the seven research questions by reviewing the theories, previous literature, and performing an event study. The study answered the following research questions:

- *Do negative corporate sustainability-related news announcements cause a market reaction to the stock prices in Europe? In Asia?*
- *Are there differences in abnormal stock returns between Europe and Asia?*
- *Does the impact of the event disappear soon after the event date? Are the impacts temporary?*
- *Are there differences in market reactions depending on the news category (economic, social, environmental) in Europe? In Asia?*
- *Are there differences between Europe and Asia on how markets react to different news topics (economic, social, environmental)?*

The main findings of the empirical research suggest that negative corporate sustainability news announcements lead to a negative and statistically significant stock market reaction in both regions in the short-term. The results are consistent with the majority of the previous studies (Consolandi et al. 2008; Cheung et al. 2013; Krüger 2015; Capelle-Blancard et al. 2019). The negative market reactions in Europe and Asia for the entire sample are significant on the event date and also significant in most of the event windows when measured with cumulative average abnormal returns.

The cumulative average abnormal returns were examined in four event windows: -1 to +1, -5 to +5, -10 to +10, and -20 to +20. The results show that returns in Europe were significantly

negative on all of these event windows, whereas in Asia, the same held for the three shortest event windows. Thus, the results indicate significant market reactions around the publications of the negative news in Europe and in Asia.

The results are similar when measured with daily average abnormal returns on the 11-day event window. The news announcements induce negative average abnormal returns on the event day in both regions. Both returns are statistically significant at the 1% level. However, in the case of Europe, it seemed that the initial market reaction did not happen on the event date but already on day $t - 4$. Thus, the market reaction on the event day might have been even stronger if the information had not leaked to the investors prior to the event date. The results are consistent with previous studies that in Europe, significantly negative abnormal returns exist shortly before and after the event, whereas in Asia, significantly negative returns are observed after the event date (Consolandi et al. (2008); Cheung et al. (2013)).

Another key finding of the study is that investors investing in European stocks put more weight on corporate sustainability than those investing in Asian companies. In Europe, the event day AAR is -1.4271 %, as the corresponding AAR in Asia is -0.7418 %. Thus, the market reaction is stronger in Europe. Moreover, the cumulative average abnormal returns produced similar results and also showed that the returns are more significant in Europe.

The regional differences are consistent with previous studies. (Cheung et al. 2010; Xu et al. 2012; Lo et al. 2018) According to previous studies, the stage of development, different conditions, values, and expectations influence how investors react to the news. Typically, the average reduction in stock prices is lower in developing countries, including many Asian countries. (Cheung et al. 2010; Xu et al. 2012).

The empirical findings also suggest that the negative news announcements affect stock prices but only temporarily. When measuring the entire sample, the negative reactions hold on the short-term, but the effects seem to attenuate shortly after the event. In other words, the results show that abnormal returns tend to decay quickly. In the case of Europe, the recovery starts after day +10, whereas in Asia, the recovery starts after day +5. The results are in line with previous studies (Consolandi et al. (2008)). I should be noted that the results do not cover the period after the event window.

Another main finding of the study is that investors in both regions value economic news significantly more than news in social and environmental categories. In the case of economic

content in the news, the effect on stock prices is more dramatic. In contrast, the effects are less significant in the case of news about social and environmental violations. The result is in line with Krüger's (2015) suggestion that investors react more intensively when the announcements have strong legal or economic content. The strong reaction can be explained by the fact that investors mainly value companies according to their financial performance. As economic incidents often have a direct financial impact, investors may expect the company's financial condition to deteriorate. Hence, a stronger investor reaction is rational.

Furthermore, the results show that there are differences between regions on how investors react to news in different news categories. As mentioned above, the reactions to economic news were negative and statistically significant in both regions. However, the findings indicate that shareholders of European companies were also significantly affected by social and environmental news, whereas the corresponding investor responses were insignificant in Asia. Thus, results support findings that the shareholders of European companies are more likely to penalize companies after negative announcements related to corporate sustainability.

In conclusion, the empirical results show that negative corporate sustainability news announcements cause significant short-term market reactions. In addition, the market reaction is more intense for companies listed in European stock exchanges. The results are in line with prior research and support the assumption of the growing trend of corporate sustainability.

Hence, companies in Europe and Asia are vulnerable to news related corporate sustainability incidents and likely to be financially affected in case of negative announcements. Therefore, corporate sustainability should be taken into account, at least in companies' long-term strategies. However, it should be noted that the results of this thesis consider only short-term impacts and that the reactions may be overreactions that do not affect a company's financial performance in the long-term.

For future research, the suggestion would be to examine the market reactions across different industries. Thus, it would be possible to assess if some industries are more vulnerable to negative news announcements and whether some industries face stronger investor reactions. The differences between industries were not included in this study. Furthermore, to induce

more applicable results for strategic decision making, it would be interesting to examine the long-term impacts of similar types of news announcements.

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APPENDICES

Appendix 1. List of details of the event data.

Company	Exchange	Paper	Date	Category
Bolloré S.A.	Euronext N.V.	Financial Times	27.5.2019	Europe Social
ING Groep N.V.	Euronext N.V.	Financial Times	9.11.2012	Europe Social
Renault S.A.	Euronext N.V.	Financial Times	15.11.2017	Europe Social
BNP Paribas S.A.	Euronext Paris	Financial Times	14.12.2015	Europe Social
PSA Group	Euronext Paris	Financial Times	26.10.2011	Europe Social
Société Générale S.A.	Euronext Paris	Financial Times	9.4.2019	Europe Social
Bayer AG	Frankfurt Stock Exchange	Financial Times	29.10.2018	Europe Social
Commerzbank AG	Frankfurt Stock Exchange	Financial Times	20.9.2019	Europe Social
Daimler AG	Frankfurt Stock Exchange	Financial Times	29.11.2019	Europe Social
Volkswagen AG	Frankfurt Stock Exchange	Financial Times	18.11.2016	Europe Social
Bayerische Motoren Werke AG	Frankfurt Stock Exchange	The Guardian	28.7.2016	Europe Social
Deutsche Lufthansa AG	Frankfurt Stock Exchange	The Wall Street Journal	19.10.2014	Europe Social
Aviva plc	London Stock Exchange	Financial Times	6.6.2019	Europe Social
BAE Systems plc	London Stock Exchange	Financial Times	9.9.2010	Europe Social
Barclays plc	London Stock Exchange	Financial Times	15.12.2015	Europe Social
BP plc	London Stock Exchange	Financial Times	22.5.2018	Europe Social
British American Tobacco plc	London Stock Exchange	Financial Times	12.9.2019	Europe Social
BT Group plc	London Stock Exchange	Financial Times	6.7.2010	Europe Social
EasyJet plc	London Stock Exchange	Financial Times	21.9.2016	Europe Social
Lloyds Banking Group plc	London Stock Exchange	Financial Times	25.11.2015	Europe Social

London Stock Exchange Group plc	London Stock Exchange	Financial Times	1.3.2019	Europe Social
Royal Mail Group plc	London Stock Exchange	Financial Times	17.8.2019	Europe Social
Ryanair Holdings plc	London Stock Exchange	Financial Times	23.8.2019	Europe Social
SSE plc	London Stock Exchange	Financial Times	8.5.2019	Europe Social
The Royal Bank of Scotland Group plc	London Stock Exchange	Financial Times	24.1.2019	Europe Social
Unilever plc	London Stock Exchange	Financial Times	28.11.2011	Europe Social
Virgin Money UK plc	London Stock Exchange	Financial Times	24.9.2019	Europe Social
WPP plc	London Stock Exchange	Financial Times	11.12.2018	Europe Social
BHP Group plc	London Stock Exchange	Reuters	1.8.2018	Europe Social
Frasers Group	London Stock Exchange	The Guardian	5.2.2017	Europe Social
International Consolidated Airlines Group, S.A.	London Stock Exchange	The Guardian	23.8.2019	Europe Social
HSBC Holdings plc	London Stock Exchange	The Wall Street Journal	10.6.2015	Europe Social
ISS A/S	Nasdaq Copenhagen	Financial Times	10.12.2018	Europe Social
Vestas Wind Systems A/S	Nasdaq Copenhagen	Financial Times	28.9.2018	Europe Social
Stora Enso Oyj	Nasdaq Helsinki	Financial Times	8.2.2015	Europe Social
Norwegian Air Shuttle ASA	Oslo Stock Exchange	Financial Times	7.2.2019	Europe Social
Telenor ASA	Oslo Stock Exchange	Financial Times	19.8.2014	Europe Social
CaixaBank, S.A.	SIX Swiss Exchange	Financial Times	8.5.2019	Europe Social
Compagnie Financière Richemont SA	SIX Swiss Exchange	Financial Times	8.2.2018	Europe Social
Nestlé S.A.	SIX Swiss Exchange	Financial Times	29.11.2011	Europe Social
UBS Group AG	SIX Swiss Exchange	Financial Times	13.3.2019	Europe Social
Credit Suisse Group AG	SIX Swiss Exchange	The Times	5.3.2018	Europe Social
Inditex	Bolsa De Madrid	The Guardian	13.6.2017	Europe Environmental

Kerry Group plc	Euronext Dublin	The Guardian	30.1.2017	Europe Environmental
Heineken N.V.	Euronext N.V.	BBC	3.2.2017	Europe Environmental
ArcelorMittal, S.A.	Euronext N.V.	Reuters	1.8.2019	Europe Environmental
Veolia Environnement S.A.	Euronext N.V.	Reuters	27.2.2018	Europe Environmental
Adidas AG	Frankfurt Stock Exchange	Reuters	9.8.2011	Europe Environmental
BASF SE	Frankfurt Stock Exchange	Reuters	22.8.2010	Europe Environmental
Thyssenkrupp AG	Frankfurt Stock Exchange	Reuters	1.11.2012	Europe Environmental
Bayerische Motoren Werke AG	Frankfurt Stock Exchange	The Guardian	5.4.2019	Europe Environmental
Daimler AG	Frankfurt Stock Exchange	The Guardian	5.4.2019	Europe Environmental
RWE AG	Frankfurt Stock Exchange	The Guardian	30.11.2017	Europe Environmental
Severn Trent plc	London Stock Exchange	Financial Times	25.3.2019	Europe Environmental
Unilever plc	London Stock Exchange	Financial Times	5.8.2015	Europe Environmental
Carnival plc	London Stock Exchange	Reuters	1.12.2016	Europe Environmental
BHP Group plc	London Stock Exchange	The Guardian	6.11.2015	Europe Environmental
Glencore plc	London Stock Exchange	The Guardian	20.12.2017	Europe Environmental
Marks & Spencer Group plc	London Stock Exchange	The Guardian	13.6.2017	Europe Environmental
Ryanair Holdings plc	London Stock Exchange	The Guardian	1.4.2019	Europe Environmental
Tesco plc	London Stock Exchange	The Guardian	5.10.2019	Europe Environmental
J Sainsbury plc	London Stock Exchange	The Independent	29.3.2019	Europe Environmental
Royal Dutch Shell PLC	London Stock Exchange	The New York Times	12.5.2016	Europe Environmental
Fortum Oyj	Nasdaq Helsinki	Yle Uutiset	8.4.2019	Europe Environmental
AB Volvo	Nasdaq Stockholm	Reuters	16.10.2018	Europe Environmental
Hennes & Mauritz	Nasdaq Stockholm	The Guardian	13.6.2017	Europe Environmental
Equinor ASA	Oslo Stock Exchange	The Guardian	20.11.2018	Europe Environmental

Nestlé S.A	SIX Swiss Exchange	The Guardian	21.7.2017	Europe Environmental
Piraeus Bank A.E.	Athens Stock Exchange	Financial Times	23.9.2019	Europe Economic
Iliad S.A.	Euronext N.V.	Financial Times	28.3.2019	Europe Economic
Kering S.A.	Euronext N.V.	Financial Times	26.1.2019	Europe Economic
Serco Group plc	Euronext N.V.	Financial Times	3.7.2019	Europe Economic
Bayer AG	Frankfurt Stock Exchange	Financial Times	28.4.2019	Europe Economic
Deutsche Börse AG	Frankfurt Stock Exchange	Financial Times	20.12.2018	Europe Economic
Wirecard AG	Frankfurt Stock Exchange	Financial Times	7.2.2019	Europe Economic
AstraZeneca plc	London Stock Exchange	Financial Times	27.4.2017	Europe Economic
Barclays plc	London Stock Exchange	Financial Times	18.11.2015	Europe Economic
De La Rue plc	London Stock Exchange	Financial Times	25.7.2019	Europe Economic
Experian plc	London Stock Exchange	Financial Times	8.10.2018	Europe Economic
Ferrexpo plc	London Stock Exchange	Financial Times	23.4.2019	Europe Economic
Foxtons Group plc	London Stock Exchange	Financial Times	18.5.2016	Europe Economic
Hiscox Limited	London Stock Exchange	Financial Times	15.5.2014	Europe Economic
HSBC Holdings plc	London Stock Exchange	Financial Times	18.1.2017	Europe Economic
M&C Saatchi	London Stock Exchange	Financial Times	24.9.2019	Europe Economic
Metro Bank plc	London Stock Exchange	Financial Times	31.1.2019	Europe Economic
RSA Insurance Group plc	London Stock Exchange	Financial Times	10.1.2014	Europe Economic
SIG plc	London Stock Exchange	Financial Times	1.2.2018	Europe Economic
Standard Chartered PLC	London Stock Exchange	Financial Times	8.1.2015	Europe Economic
Ted Baker plc	London Stock Exchange	Financial Times	2.12.2019	Europe Economic
Telit Communications	London Stock Exchange	Financial Times	9.8.2017	Europe Economic
Tesco plc	London Stock Exchange	Financial Times	22.9.2014	Europe Economic

Wm Morrison Supermarkets	London Stock Exchange	Financial Times	21.4.2019	Europe Economic
WPP plc	London Stock Exchange	Financial Times	13.3.2016	Europe Economic
Vodafone Group plc	London Stock Exchange	Reuters	26.6.2012	Europe Economic
Danske Bank A/S	Nasdaq Copenhagen	Financial Times	27.2.2018	Europe Economic
Nordea Bank Abp	Nasdaq Helsinki	Financial Times	23.7.2018	Europe Economic
Electrolux AB	Nasdaq Stockholm	Financial Times	30.1.2014	Europe Economic
Hexagon AB	Nasdaq Stockholm	Financial Times	31.10.2016	Europe Economic
Skandinaviska Enskilda Banken AB	Nasdaq Stockholm	Financial Times	23.7.2018	Europe Economic
Skanska AB	Nasdaq Stockholm	Financial Times	17.1.2018	Europe Economic
Svenska Handelsbanken AB	Nasdaq Stockholm	Financial Times	23.7.2018	Europe Economic
Swedbank AB	Nasdaq Stockholm	Financial Times	22.3.2019	Europe Economic
Credit Suisse Group AG	SIX Swiss Exchange	Financial Times	31.3.2017	Europe Economic
Swiss Reinsurance Company Ltd	SIX Swiss Exchange	Financial Times	7.5.2014	Europe Economic
UBS Group AG	SIX Swiss Exchange	Financial Times	2.5.2019	Europe Economic
Tata Motors Limited	BSE Limited	Financial Times	10.1.2019	Asia Social
Infosys Ltd	BSE Limited	The Economic Times	5.10.2019	Asia Social
Jet Airways (India) Ltd	BSE Limited	The Economic Times	22.10.2018	Asia Social
Maruti Suzuki India Limited	BSE Limited	The Economic Times	9.10.2011	Asia Social
Cox & Kings Ltd	BSE Limited	The Times of India	4.10.2019	Asia Social
Samsung Electronics Co, Ltd	Korea Exchange	Financial Times	6.8.2014	Asia Social
Hanjin Group/Hanjin KAL Corporation	Korea Exchange	Nikkei Asia	11.11.2016	Asia Social
KB Kookmin Bank	Korea Exchange	Reuters	10.2.2011	Asia Social
Asiana Airlines Inc	Korea Exchange	The Korea Times	5.1.2016	Asia Social
Daewoo Shipbuilding & Marine Engineering Co., Ltd	Korea Exchange	The Korea Times	18.5.2016	Asia Social

Hyundai Motor Company	Korea Exchange	The Korea Times	10.7.2016	Asia Social
Kumho Tire Co., Inc	Korea Exchange	The Korea Times	13.3.2018	Asia Social
Posco International Corp	Korea Exchange	The Wall Street Journal	14.8.2014	Asia Social
Wipro	National Stock Exchange of India Limited	The Economic Times	12.8.2019	Asia Social
PLTD, Inc.	Philippine Stock Exchange	Nikkei Asia	8.3.2017	Asia Social
Wilmar International Limited	Singapore Exchange	Asia Times	30.10.2016	Asia Social
BYD Co Ltd	Stock Exchange of Hong Kong	Forbes	31.8.2011	Asia Social
Tencent Holdings Ltd	Stock Exchange of Hong Kong	Nikkei Asia	22.3.2019	Asia Social
Cathay Pacific Airways Ltd	Stock Exchange of Hong Kong	South China Morning Post	21.5.2017	Asia Social
Lenovo Group Limited	Stock Exchange of Hong Kong	South China Morning Post	13.8.2015	Asia Social
Yue Yuen Industrial (Holdings) Limited	Stock Exchange of Hong Kong	South China Morning Post	18.3.2015	Asia Social
The Bank of East Asia Limited	Stock Exchange of Hong Kong	The Business Times	2.6.2016	Asia Social
HTC Corporation	Taiwan Stock Exchange	Forbes	4.7.2018	Asia Social
Hon Hai Precision Industry (Foxconn)	Taiwan Stock Exchange	Nikkei Asia	18.1.2019	Asia Social
China Airlines	Taiwan Stock Exchange	South China Morning Post	7.2.2019	Asia Social
EVA Airways Corp	Taiwan Stock Exchange	South China Morning Post	20.6.2019	Asia Social
Pou Chen Corporation	Taiwan Stock Exchange	South China Morning Post	2.4.2015	Asia Social
Dynamic Electronics Co., Ltd.	Taiwan Stock Exchange	Taipei Times	27.8.2019	Asia Social
Nanya Technology	Taiwan Stock Exchange	Taipei Times	5.10.2012	Asia Social
Fujifilm Holdings Corporation	Tokyo Stock Exchange	Financial Times	31.1.2018	Asia Social
Toyota Motor Corporation	Tokyo Stock Exchange	Financial Times	18.6.2010	Asia Social
Nissan Motor Co, Ltd	Tokyo Stock Exchange	Forbes	24.7.2019	Asia Social
Citizen Watch Co., Ltd	Tokyo Stock Exchange	Nikkei Asia	25.2.2015	Asia Social
Mitsui Engineering & Shipbuilding (Mitsui E&S)	Tokyo Stock Exchange	Nikkei Asia	9.11.2019	Asia Social

Mizuho Financial Group, Inc	Tokyo Stock Exchange	Nikkei Asia	14.11.2017	Asia Social
Nomura Holdings, Inc.	Tokyo Stock Exchange	Nikkei Asia	4.4.2019	Asia Social
Seven & i Holdings Co., Ltd	Tokyo Stock Exchange	Nikkei Asia	11.10.2019	Asia Social
Sompo Holdings, Inc	Tokyo Stock Exchange	Nikkei Asia	24.6.2019	Asia Social
Sony Corporation	Tokyo Stock Exchange	Reuters	9.4.2012	Asia Social
Panasonic Corporation	Tokyo Stock Exchange	The Guardian	21.11.2016	Asia Social
SoftBank Group Corp	Tokyo Stock Exchange	The New York Times	21.11.2019	Asia Social
Coal India Limited	BSE Limited	The Economic Times	7.9.2018	Asia Environmental
Indian Oil Corporation Limited	BSE Limited	The Economic Times	5.2.2017	Asia Environmental
Hanwha Solutions	Korea Exchange	The Korea Times	17.4.2019	Asia Environmental
Hyundai Steel Co., Ltd	Korea Exchange	The Korea Times	4.6.2019	Asia Environmental
LG Chem Ltd	Korea Exchange	The Korea Times	17.4.2019	Asia Environmental
POSCO	Korea Exchange	The Korea Times	4.6.2019	Asia Environmental
S-Oil Corporation	Korea Exchange	The Korea Times	6.4.2014	Asia Environmental
SK Group	Korea Exchange	The Korea Times	10.11.2013	Asia Environmental
Dr. Reddy's Laboratories Ltd	National Stock Exchange of India Limited	The Economic Times	9.11.2013	Asia Environmental
Tata Power Limited	National Stock Exchange of India Limited	The Economic Times	24.2.2017	Asia Environmental
Oil and Natural Gas Corporation Ltd	National Stock Exchange of India Limited	The Times of India	21.1.2011	Asia Environmental
Petron Corporation	Philippine Stock Exchange	South China Morning Post	13.8.2013	Asia Environmental
Anhui Jianghuai Automobile Co., Ltd	Shanghai Stock Exchange	China Daily	8.7.2019	Asia Environmental
Sinopec/China Petroleum & Chemical Corporation	Shanghai Stock Exchange	China Daily	6.4.2017	Asia Environmental
Aluminum Corporation of China Limited (Chinalco)	Shanghai Stock Exchange	South China Morning Post	10.12.2014	Asia Environmental

Olam International Limited	Singapore Exchange	Financial Times	12.12.2016	Asia Environmental
Formosa Plastics Corp	Taiwan Stock Exchange	Nikkei Asia	27.4.2016	Asia Environmental
Mazda Motor Corporation	Tokyo Stock Exchange	Nikkei Asia	10.8.2018	Asia Environmental
Nissan Motor Co., Ltd.	Tokyo Stock Exchange	Nikkei Asia	26.9.2018	Asia Environmental
Subaru Corporation	Tokyo Stock Exchange	Nikkei Asia	6.6.2018	Asia Environmental
Suzuki Motor Corporation	Tokyo Stock Exchange	Nikkei Asia	9.8.2018	Asia Environmental
Yamaha Motor Company, Limited	Tokyo Stock Exchange	Nikkei Asia	11.8.2018	Asia Environmental
Fast Retailing Co., Ltd	Tokyo Stock Exchange	Reuters	21.7.2017	Asia Environmental
Komatsu Ltd.	Tokyo Stock Exchange	Reuters	20.6.2018	Asia Environmental
Mitsui & Co., Ltd.	Tokyo Stock Exchange	Reuters	20.3.2019	Asia Environmental
Punjab National Bank	BSE Limited	Financial Times	14.2.2018	Asia Economic
Garuda Indonesia	Indonesia Stock Exchange	Financial Times	26.7.2019	Asia Economic
PT Bank Central Asia Tbk.	Indonesia Stock Exchange	Reuters	22.4.2014	Asia Economic
Korean Air	Korea Exchange	Financial Times	29.5.2018	Asia Economic
Lotte Corporation	Korea Exchange	Financial Times	22.12.2017	Asia Economic
Asiana Airlines	Korea Exchange	Nikkei Asia	27.3.2019	Asia Economic
Celltrion, Inc.	Korea Exchange	The Korea Times	12.12.2018	Asia Economic
Hyosung Corporation	Korea Exchange	The Korea Times	5.9.2013	Asia Economic
LG Group	Korea Exchange	The Korea Times	9.5.2018	Asia Economic
YG Entertainment	Korea Exchange	The Korea Times	21.3.2019	Asia Economic
Bharti Airtel Limited	National Stock Exchange of India Limited	Reuters	15.5.2012	Asia Economic
ICICI Bank Limited	National Stock Exchange of India Limited	Reuters	14.3.2013	Asia Economic
8K Miles Software Services Ltd	National Stock Exchange of India Limited	The Economic Times	4.11.2019	Asia Economic

Axis Bank	National Stock Exchange of India Limited	The Economic Times	17.12.2016	Asia Economic
HDFC Bank Limited	National Stock Exchange of India Limited	The Economic Times	15.10.2015	Asia Economic
Singapore Post Limited	Singapore Exchange	Nikkei Asia	19.5.2016	Asia Economic
China Hongqiao Group Co., Ltd.	Stock Exchange of Hong Kong	Financial Times	23.11.2016	Asia Economic
Evergrande Group	Stock Exchange of Hong Kong	Financial Times	29.4.2019	Asia Economic
Pou Sheng International (Holdings) Ltd	Stock Exchange of Hong Kong	Nikkei Asia	9.1.2017	Asia Economic
Anta Sports Products Limited	Stock Exchange of Hong Kong	Reuters	15.6.2018	Asia Economic
Yurun Group Limited	Stock Exchange of Hong Kong	Reuters	27.6.2011	Asia Economic
Samsonite International S.A.	Stock Exchange of Hong Kong	South China Morning Post	24.5.2018	Asia Economic
Nexon Co., Ltd	Tokyo Stock Exchange	BusinessKorea	13.2.2019	Asia Economic
Dentsu Group Inc.	Tokyo Stock Exchange	Financial Times	23.9.2016	Asia Economic
Sharp Corporation	Tokyo Stock Exchange	Financial Times	3.2.2015	Asia Economic
Daiwa House Industry Co, Ltd.	Tokyo Stock Exchange	Nikkei Asia	14.3.2019	Asia Economic
FamilyMart Co., Ltd.	Tokyo Stock Exchange	Nikkei Asia	15.11.2019	Asia Economic
Hitachi, Ltd	Tokyo Stock Exchange	Nikkei Asia	3.11.2018	Asia Economic
Kameda Seika Co., Ltd.	Tokyo Stock Exchange	Nikkei Asia	15.12.2017	Asia Economic
Lixil Group Corporation	Tokyo Stock Exchange	Nikkei Asia	22.5.2015	Asia Economic
Akebono Brake Industry Co., Ltd	Tokyo Stock Exchange	Reuters	4.11.2015	Asia Economic
Fujifilm Holdings Corporation	Tokyo Stock Exchange	Reuters	9.6.2017	Asia Economic
Japan Display Inc	Tokyo Stock Exchange	Reuters	27.11.2019	Asia Economic
Kobe Steel, Ltd.	Tokyo Stock Exchange	Reuters	5.3.2018	Asia Economic
Toshiba Corporation	Tokyo Stock Exchange	Reuters	21.7.2015	Asia Economic
Ricoh Company, Ltd	Tokyo Stock Exchange	The Economic Times	22.7.2016	Asia Economic
Renesas Electronics Corporation	Tokyo Stock Exchange	The Japan Times	4.7.2012	Asia Economic
The Kansai Electric Power Co., Inc	Tokyo Stock Exchange	The Japan Times	27.9.2019	Asia Economic

Appendix 2. Robustness check: Average abnormal returns in the 11-day window in Europe and Asia.

Event window	Europe		Asia	
	AAR	t-value	AAR	t-value
-5	-0,0669 %	-0,3973	-0,0134 %	-0,0601
-4	-0,4482 %	-2,6616***	-0,1678 %	-0,7502
-3	0,0192 %	0,1143	-0,1781 %	-0,7962
-2	-0,7909 %	-4,6963***	0,2799 %	1,2515
-1	-0,0283 %	-0,1682	-0,6824 %	-3,0512***
0	-1,5708 %	-9,3279***	-0,8313 %	-3,7168***
1	-0,0367 %	-0,2178	-0,6248 %	-2,7934***
2	-0,2337 %	-1,3875	-0,0308 %	-0,1377
3	-0,5012 %	-2,9764**	-0,2119 %	-0,9472
4	0,1612 %	0,2378	-0,2428 %	-1,0857
5	-0,1568 %	-0,9308	-0,3498 %	-1,5640

Significance level: ***1%, **5%, *10%.

Appendix 3. Robustness check: Cumulative average abnormal returns in Europe and Asia.

Event window	Europe		Asia	
	CAAR	t-value	CAAR	t-value
[-1, +1]	-1,6358 %	-5,2827***	-2,1385 %	-5,5115***
[-5, +5]	-3,7742 %	-6,3651***	-3,0533 %	-4,1094***
[-10, +10]	-5,7192 %	-6,9808***	-4,3199 %	-4,2081***
[-20, +20]	-5,5824 %	-4,8764***	-5,1823 %	-3,6128***

Significance level: ***1%, **5%, *10%.

Appendix 4. Robustness check: Cumulative average abnormal returns in Europe – grouped by news category.

Event window	Economic		Social		Environmental	
	CAAR	t-value	CAAR	t-value	CAAR	t-value
[-1, +1]	-3,2599 %	-4,8456***	-0,5042 %	-1,1607	-1,1526 %	-2,8330***
[-5, +5]	-7,1382 %	-5,5412***	-1,9672 %	-4,5282***	-1,9060 %	-2,4464**
[-10, +10]	-9,4402 %	-5,3037***	-3,5488 %	-8,1688***	-3,9301 %	-3,6509***
[-20, +20]	-9,1617 %	-3,6838***	-3,0461 %	-7,0116***	-4,5858 %	-3,0488***

Significance level: ***1%, **5%, *10%.

Appendix 5. Robustness check: Cumulative average abnormal returns in Asia – grouped by news category.

Event window	Economic		Social		Environmental	
	CAAR	t-value	CAAR	t-value	CAAR	t-value
[-1, +1]	-4,1709 %	-5,9524***	-1,2651 %	-2,0556**	-0,4817 %	-1,0044
[-5, +5]	-4,8334 %	-3,6023***	-3,1534 %	-2,6757**	-0,1832 %	-0,1995
[-10, +10]	-5,3046 %	-2,8613***	-6,1631 %	-3,7848***	0,1995 %	0,1572
[-20, +20]	-6,0059 %	-2,3185**	-6,5348 %	-2,8721***	-1,7124 %	-0,9658

Significance level: ***1%, **5%, *10%.