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Market reactions to Environmental, Social, and Governance (ESG)-news: Evidence from European Markets

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Department of Finance
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Abstract

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MARKET REACTIONS TO ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG)-NEWS: EVIDENCE FROM EUROPEAN MARKETS

PURPOSE OF THE STUDY

The purpose of this thesis is to study and evaluate the public attitude and reactions to reportages of environmental, social, and corporate governance (ESG) related corporate misbehavior as they externalize in changes in the investors' investing behavior. More specifically, the stock market reactions to negative ESG-news are measured and analyzed in order to answer how negative ESG-news affect companies' stock returns in the short- and long-run, and whether the market reaction has changed over time.

DATA

The empirical study is based on a dataset of 123 negative ESG-news concerning companies that are publicly listed in Europe. The news articles were published between 1st of January 1998 and 31st of December 2007 mainly in The Financial Times. The topics of the news were related to irresponsible behavior of companies in regard to people, environment, or laws and regulations. The market reaction to the news was measured as abnormal stock returns, and thus time series of firm specific daily returns were used on this study.

RESULTS

The main findings of this research show a significantly negative market reaction in stock returns in the short-term (±5 days) and a significantly positive in the long-term (12, 24, and 36 months). Thus, the empirical results indicate that investors overreact to the news. The results also suggest that the short-term negative reaction has intensified over the years and the long-term buy-and-hold abnormal returns have decreased. On average, the initial market reaction was -2.3% and took place four days before the news was published in a newspaper. The 11-day cumulative abnormal returns were -3.1% for the total sample. Significant buy-and-hold abnormal returns were observed during the three post-event years (36 month BHAR +25%), however, significant and positive abnormal returns were not persistently present in each month. The news category of environmental, social or corporate governance influenced significantly the extent and direction of the market reaction

KEYWORDS

Environmental, social, and corporate governance (ESG) news, stock market reaction, corporate social responsibility (CSR), cumulative abnormal returns (CAR), buy-and-hold abnormal returns (BHAR), mean monthly abnormal returns (MMAR)

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MARKKINAREAKTIO ENVIRONMENTAL, SOCIAL, GOVERNANCE (ESG)-UUTISIIN: EUROOPAN MARKKINAT

TUTKIELMAN TAVOITTEET

Tutkielman tavoitteena on mitata ja analysoida sijoittajien suhtautumista ja reaktiota uutisointeihin negatiivisista ESG- (Environmental, Social, Governance) tapauksista niiden ilmetessä muutoksina sijoittajien kaupankäynnissä. Tarkemmin sanottuna, tutkimuksessa mitataan ja analysoidaan osakemarkkinareaktioita negatiivisiin ESG-uutisiin, jotta saadaan vastaus kysymyksiin kuinka uutiset vaikuttavat osaketuottoihin lyhyellä- ja pitkällä tähtäimellä ja kuinka tämä vaikutus on muuttunut yli ajan.

LÄHDEAINEISTO

Tämä empiirinen tutkimus perustuu 123:een negatiiviseen ESG-uutiseen Euroopassa listatuista yrityksistä. Uutisartikkelit oli julkaistu 1. tammikuuta 1998 ja 31. joulukuuta 2007 välillä, pääasiassa The Financial Times:ssa. Uutisten aiheet liittyivät yritysten vastuuttomaan käyttäytymiseen liittyen ihmisiin, ympäristöön, tai lakeihin ja säädöksiin. Uutisten markkinareaktiota mitattiin epänormaaleina osaketuottoina, joten tässä tutkimuksessa hyödynnettiin aikasarjoja yrityskohtaisista, päivittäisistä osaketuotoista.

TULOKSET

Empiiriset tulokset osoittavat, että markkinareaktio oli merkittävästi negatiivinen lyhyellä (±5 päivää) ja positiivinen pitkällä tähtäimellä (12, 24, 36 kuukautta). Tulokset viittaavat siis siihen, että markkinat ylireagoivat uutisiin. Tulosten mukaan reaktio on myös voimistunut viimeisen 10-vuoden aikana. Markkinoiden ensireaktio tapahtui neljä päivää ennen uutisen julkaisua sanomalehdessä ja oli keskimäärin -2.3 %. 11-päivän kumulatiivinen vaikutus tuottoihin oli -3.1 %. Uutista seuranneilta kolmelta vuodelta havaittiin merkittäviä positiivisia epänormaaleja tuottoja (36 kk BHAR +25 %), joskaan ylituotot eivät olleet johdonmukaisesti positiivisia joka kuukausi. Reaktion voimakkuuteen ja suuntaan vaikutti se, liittyikö uutinen ympäristö-, sosiaalisiin, vai hallinnollisiin seikkoihin.

AVAINSANAT

Ympäristö-, sosiaali- ja hallinto-uutiset, osakemarkkinareaktio, yritysvastuullisuus (CSR), kumulatiiviset epänormaalit tuotot (CAR), buy-and-hold epänormaalit tuotot (BHAR), keskimääräiset epänormaalit kuukausituotot (MMAR)

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Helsinki, January 21st, 2012

Sini Länsilahti

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1. Introduction

1.1 Academic and practical motivation

Concerns over whether or not our current market economy is able to provide sustainable long-term growth have intensified over recent years. The financial crisis that followed the subprime mortgage crisis in the U.S. in 2008 was rapidly felt worldwide. More recently, the European debt crisis (in 2011) not only threatens the existence of the European Monetary Union (EMU) and the stability of the European economy, but has affected the entire global economy. The worldwide effects of initially regional problems signal the downside of having a truly global financial market. The crises have revealed the vulnerability of national economies and global capital markets to systemic shocks and their devastating impact on economic growth and stability (UNEP, 2010). This has forced the business leaders and financial practitioners worldwide to reconsider the fundamentals of the traditional business and asset pricing models as the public demands for sustainable capitalism.

Corporate Social Responsibility (CSR) and Socially Responsible Investing (SRI) have become topics of the day. The amounts of resources firms allocate into CSR activities have increased notably during the past years and often represent a substantial cost item for the companies. For example, General Electric spends approximately 15% of its profits on CRS-related expenses (Barnea et al., 2010). Unfortunately, the corporate trend of increased CSR activities is not necessarily good news to the investors or to the public, as the motives and consequences of such actions vary and even when they do signal responsible and ethical behavior, they may not lead to firm value maximization.

The concept of Environmental, Social and Corporate Governance (ESG) brings together the three main factors in evaluating the sustainability and ethical impact of an investment in a company or business. The relevance of analyzing ESG issues is undeniable, considering the possible financial impacts of these traditionally non-financial issues. White-collar crimes such as accounting fraud, environmental violations such as oil spills, or for example, the use of child labor or sweat shops can induce massive financial, legal, and reputational consequences for companies.

In response to these concerns, The UN Principles for Responsible Investment (UN PRI) were developed in 2005 and launched in April 2006 by Kofi Annan at the New York Stock Exchange. UN PRI is an investor initiative in partnership with UNEP Finance Initiative and the UN Global Compact. It is based on the idea that ESG issues can affect the performance of investment portfolios and therefore, institutional investors should consider them alongside more conventional financial

factors in order to fulfill their fiduciary responsibilities. By signing the UN PRI, investors commit themselves inter alia to developing their investment practices on the basis of the principles, taking into account responsibility issues in their investment decisions and acting as active owners. As of October 2010 over 800 investment institutions from 45 countries have become signatories. The long-term goal is to integrate ESG analysis into traditional financial analysis and the ESG issues into portfolio construction process of asset managers. (UNPRI)

Business ethics and sustainable markets are naturally something to be encouraged for their intrinsic humanitarian values, but what are the financial consequences of being ethical? The number of academic studies in this field has increased significantly especially during the past five years, but no clear consensus has been reached on whether investing in socially responsible stocks or funds is more profitable than traditional stocks or funds. However, according to Barnea and Rubin (2010), a majority of existing studies have found a positive relation between CSR ratings and financial performance. In theory, it is possible to justify a positive, a negative, or no relationship between firm's social and financial performance (Brammer et al.).

When evaluating the economic impact of SRI, one should consider three different perspectives: The investors', the companies' and the intermediary investment banks' perspective. For instance, for an investment bank, committing themselves to the UN PRI can support their reputation as responsible investors, but it also narrows down their investment horizon. Ultimately, the profitability of being responsible depends on whether or not the market values corporate social responsibility and corporate sustainability (CS). The companies' incentives to invest in CSR and CS are low, if the investors don't value their efforts. Likewise, incentives for asset managers to limit their investment horizon by excluding unethical stocks and funds are low, if their clients don't appreciate the gesture.

The purpose of this thesis is to study and evaluate the public attitude and reactions to reportage of environmental, social, and corporate governance related corporate misbehavior as they externalize in changes in the investors' investing behavior.

1.2 Objective and research problems

The fundamental objective of this thesis is to examine and evaluate the significance of negative ESG-events to investors. I studied the market reactions to negative ESG news by performing an event study. More specifically, I examined the short- and long-term impact of the news release on the market value of listed companies. In addition, I evaluated how the market reaction has evolved over time by dividing the event window of years 1998-2007 into two five-year sub-periods and conducting a comparative analysis between the results. Based on earlier studies (Lougee and Wallace, 2008), I hypothesize that the significance of socially responsible investing, and thus the market's interest in ESG news, has increased substantially during the past decade. Thus the research problem of the thesis diverges into two questions defined as:

1. How do negative ESG-news affect companies' stock returns in the short- and long-run?
2. Has the market reaction to negative ESG-news changed over time?

1.3 Contribution and main findings

1.3.1 Contribution

The existing literature and research in the field of CSR has mainly focused on the relationship between companies' ESG-related performance (such as CSR ratings) and stock returns, as well as the consequences of misdemeanor. However, there are yet few studies on the stock price effect of ESG-related press releases and the existing empirical evidence is varied. To my knowledge, there has been no previous comparative analysis between the market reactions to the three different news categories.

Moreover, the focus of the earlier research has been especially on the short-term market effects and therefore, the most important contribution of this study is the analysis of long-term effects of ESG-news on stock performance. While short-term stock performance is perhaps the main focus of interest for (short-term) investors, the long-term stock performance is of interest not only to longer-term investors, but also the management and employees of the company. Depending on the compensation schemes of a specific company, variation in the returns on the firm's stock can significantly affect the compensation and thus perhaps the motivation of the employees. Naturally, the negative publicity and reputation that is likely to follow a revelation of a neglect or crime related to ESG issues, could also affect the employees' motivation and willingness to work for the company as well as clients and partners willingness to do business with that company. Also, in order for the management to decide on proactive and reactive measures concerning ESG-events,

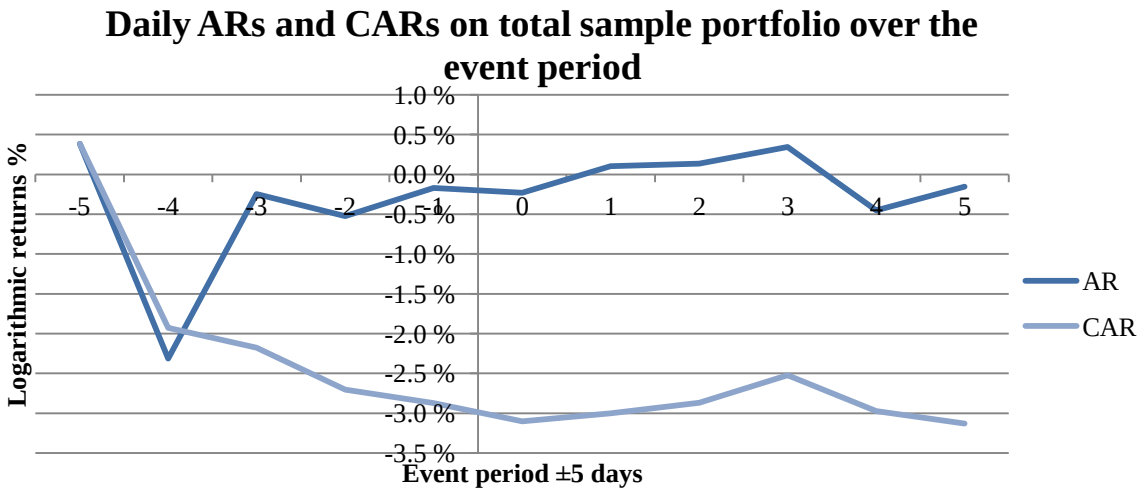
they need to be able to estimate how the investors are going to react in longer term. Therefore, evaluating how investors in the market experience such events and reacts to the news in the long-term is important from many perspectives.

In addition, I have not thus far come across comparative analyses of datasets from different time periods for environmental or governance news reportage, and hence, this aspect of my study complements the existing research as well. The overall contribution of this thesis is to shed light on how investors perceive ESG-news and how their view has changed over time.

1.3.2 Main findings

The main findings of this research show a significantly negative market reaction in stock returns in the short-term (±5 days) and a significantly positive in the long-term (12, 24, and 36 months). The empirical results also suggest that the short-term negative reaction has intensified over the years and the long-term buy-and-hold abnormal returns have decreased. On average, the initial market reaction (measured with Ordinary Least Squares regression) was -2.3% (and by Generalized Least Squares: -1.1%) and took place four days before the news was published in a newspaper. The 11-day cumulative abnormal returns were -3.1% (GLS: -1.3%) for the total sample. Significant buy-and-hold abnormal returns were observed during the three post-event years (36 month BHAR +25%), however, significant and positive abnormal returns were not persistently present in each month. The news category of environmental, social or corporate governance influenced significantly the extent and direction of the market reaction.

Figure 1: Short-term abnormal returns (AR) and cumulative abnormal returns (CAR) over the ±5 day event period for the total sample portfolio estimated using the OLS regression analysis



Note: Day 0 denotes the day of the publication of the news.

Based on the empirical results, negative ESG-news induces a significant fall in stock returns in short-term, but already at annual level the abnormal returns turn positive. This indicates an initial overreaction by the market and relatively quick recovery signaling either forgiveness or forgetfulness of the investors. It should be noted, however, that the results apply for a portfolio of irresponsible companies and thus provide a general idea of the market sentiment and are not directly applicable to individual cases.

Nevertheless, it would seem that for current owners of stock this is good news, given that they are willing to hold to stock in their portfolio for a longer-period (e.g. a year). In the case of an ESG-event and the corresponding news, also short-term investors should hold on to the stock until the returns have recovered (at least a week). Most profitable strategy would be to buy the undervalued stock right after the initial plunge and hold it in the investment portfolio for at least a year, benefiting both from buying at discount and from the buy-and-hold abnormal returns at annual level. The ideal holding period depends on the news category. After environmental news, the buy-and hold abnormal returns are highest with 12 month holding period, and after social and governance news, it would appear to be profitable to hold the stock for 36 months.

From the company's perspective, the results are also interesting, as they would not encourage remedial actions at strategic or operative level. It should be kept in mind that this study analyzed only the investors' reaction to ESG-news and not for example, the customers' reaction. However, customers' negative reaction would most likely indirectly impact the stock prices in the form of decreasing sales and cash flow, which would lead to lower profits and plausibly, to lower stock price. Since the long-term stock returns are positive, it can be assumed that in general, the customers have not significantly changed their purchasing behavior after the ESG-event. Still, the findings of intensified negative reaction and decreased positive long-term returns over time support the theory of the increased role and importance of corporate social responsibility. This is likely to impact irresponsible companies' profitability, and thus CSR should be considered at least in the long-term strategy.

The private and institutional investors, who have limited their investment horizon by excluding unethically operating companies, forgo an opportunity to exploit the overreaction of the market to ESG-news. Since this window of opportunity and the potential financial benefits are getting slimmer, the cost of responsible investment is getting smaller as well.

The empirical results are reported in more detail in chapter 6 and their implications in chapter 8.

1.4 Limitations

The limitations of the study relate to both the event and stock market data and methodology. Limitations on the data relate to the sample size, for instance. The reliability of the results and the statistical significance of the analysis grows with the sample size, but due to the challenges and limitations of collecting the data case-by-case, the sample used in this study is relatively small (123 cases). There is a risk of selection bias in collecting the event sample, which, however, has been mitigated by using specific criteria for the selection process (discussed in more detail in section 4.1). Also the risk of failing to filter out the effects of simultaneous firm specific explanatory events can deteriorate the credibility of the results. Confounding or irrelevant events in the event period could impact the results. However, identifying all irrelevant events and excluding them would be difficult and might lead to only a partial adjustment. Also, Thompson (1988) concluded in his study that the impact of irrelevant events in the sample on the results is marginal. Thus, I have made no adjustments for extraneous events in this study.

Another possible source of error is the benchmark used to estimate abnormal returns. While using indices is a popular choice, it is not optimal for long-term event studies. While the use of a matched firm control sample as the reference portfolio has proven to solve many of the problems related to the use of indices, the actual formation of the matched sample is subjective to certain extent (see 4.2.2 for more detail). The influence of the benchmark portfolio on the results has been analyzed by conducting the long-term quantitative analyses with both a reference portfolio of matched firms and a reference portfolio of matched sector indices.

The traditional limitations of event studies relate to the particular characteristics of daily stock return data. Potential problems are associated with, for example, non-normality of returns and excess returns, biased OLS estimates for market model parameters, variance shifts, and autocorrelation. Especially the measuring and evaluation of long-term market effects is challenging and prone to errors and biases such as: the survivor bias, the rebalancing bias, the skewness bias, and the specification bias. The limitations and difficulties regarding the long-term abnormal return estimations and the methodology overall are discussed in more detail in the methodology section 5. In order to overcome the limitations due to challenges in methodology and data, alternative reference portfolios and methods have been used in this study to enable a comparative and thus more profound analysis of the results.

1.4 Structure of the study

This study is structured as follows. Section 2 covers a brief literature review and a discussion on its scope, merits and limitations. Section 3 defines and justifies the research hypotheses. Section 4

follows with a description of the data used in the analysis, an explanation of the data processing, and reasoning for the event selection is explained. Subsequently, the methodologies and model specifications are described in section 5. The empirical results of the event study are presented in section 6 and additional tests and robustness checks are reported in section 7. Section 8 continues with the interpretation and analysis of results. Section 9 concludes the study and the final section 10 suggests areas for further research.

2. Theoretical background

2.1 Towards sustainable capitalism

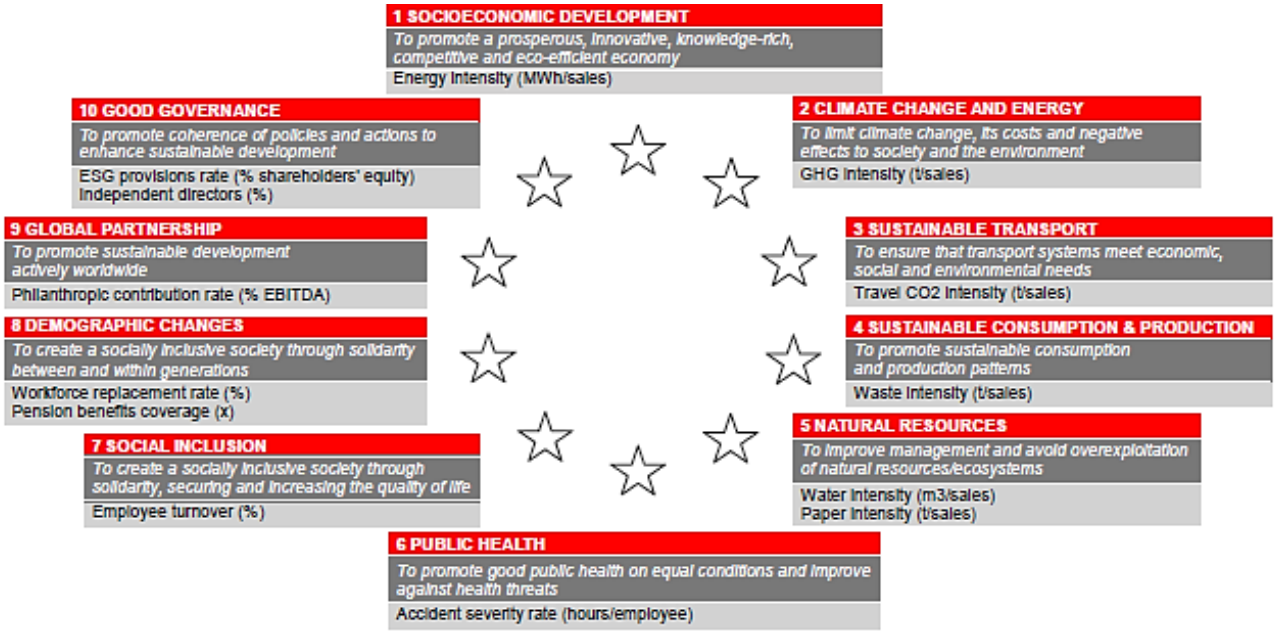
Socially Responsible Investment (SRI) is an investment strategy that aims to maximize both financial returns and social good. It is related to corporate social responsibility (CSR) and a growing number of large institutional investors, such as mutual funds and pension funds, use ethical criteria in their stock selection process. The investment strategies do not necessarily create a positive impact, but satisfy the responsibility aspect by non-harming, for example by screening out "sin-stocks" such as those of tobacco, alcohol, and gambling industries, or stocks of companies that otherwise have poor CSR records. The concept of ESG summarizes the three main concerns of the SRI industry.

Company specific ESG data has become more and more available during recent years as data providers such as Thomson Reuters and Bloomberg have started delivering such data. However, interpreting ESG factors and integrating ESG analysis into financial analysis of companies remains a challenge. Companies understand their business the best and are able to identify those ESG factors that are financially material and central to their business. Meanwhile, asset managers, who have access to the ESG data, are far less qualified in interpreting them and tend to focus on reputational issues. It could be the case that there are communicational problems between companies' sustainability managers and asset managers, and this would widen the gap between companies and investment firms even further. Until ESG becomes a part of the mainstream analysis, the lack of expertise and information about ESG will make sustainability reports difficult to use in company valuation. (UNEP FI, 2010)

An example of a financial institution that has made sustainable banking their business is UniCredit, which operates the largest international banking network of approximately 50 markets and has strong origins in 22 European countries. The Halo's Creed, UniCredit's new ESG research methodology, is an investment philosophy based on maximizing both shareholder and broader

stakeholder returns. It is based on the ten thematic principles of the European Sustainable Development Strategy (figure 2) aiming to incorporate the effects of ESG issues into stock valuation and selection processes.

Figure 2: Halo's Creed



Source: UniCredit Research, 2010

Based on UniCredit's event study analysis the efficient-market hypothesis remains weak regarding the information integration of ESG issues. Their study suggests that capitalized ESG issues can affect stock valuations by an average 1.7% and thus capital asset pricing models' efficiency can be improved by adding a sustainability dimension. By mainstreaming ESG information, stock prices should eventually reflect ESG-related capital flows as well as public's attitudes toward CSR. Once ESG information is mainstream and a part of company analyses, ESG related news releases should not impact stock prices. (UniCredit)

Investors are naturally interested in the profitability of investing in socially responsible stocks or funds. From a theoretical perspective, a positive, a negative, or no relationship between firm's social and financial performance can be justified. In their study (2006), Brammer, Brooks, and Pavelin suggest that, assuming efficient markets, equilibrium should develop in engaging in socially responsible activities: The activities take place until their marginal profitability is zero. Therefore the returns should be the same for responsible and irresponsible companies for a given level of risk and other company specific characteristics.

However, consequently at the portfolio level, the investors will suffer, as the screening-out process will narrow their investment horizon, which reduces the efficiency of the portfolio. Then again, corporate social responsibility can improve firm's operating performance which could positive influence its stock price. The performance of ethical stocks or funds is thus dependent on several opposite forces (Brammer et al.). According to Barnea and Rubin (2010), majority of SRI related studies have found a positive correlation between CSR ratings and stock price performance. How well the CRS ratings capture the actual extent of social responsibility practiced is, however, debatable.

Whether or not investors benefit from a company's CRS activities is also influenced by the management's underlying motives for CRS. In 2006, Amir Barnea and Amir Rubin published a study on CSR as conflict between shareholders. They hypothesized that a firm's insiders may induce firms to overinvest in CSR for their private benefit to the extent that doing so improves their reputations as global citizens and has a so called "warm-glow" effect, while they bear little of the cost of doing so. Their main finding was that on average, insiders' ownership and leverage is negatively related to the firm's social rating, while institutional ownership is uncorrelated with it. This supports their hypothesis assuming that the level of CSR expenditures is positively correlated with the firm's CRS rating. The conflict can be mitigated if insiders hold a large fraction of the firm because they would be less likely to participate in firm value reducing activity. In addition, the capital structure can ease the conflict as higher debt capital limits the amount of free cash flow available to insiders.

Barbara Lougee and James Wallace (2008) studied the trends in the Corporate Social Responsibility (CSR) and its link to company performances in the United States during years 1992-2006. They found that although companies have significantly increased their CSR activities and investments, the number of CSR concerns has increased and thus the "net" CSR strength of companies has decreased. This could be interpreted as CSR activities having a positive trend but, however, the slope of the trend of increased CSR concerns being steeper.

Lee and Shin (2010) studied Korean consumer behavior and observed that corporate social contributions and local community contributions significantly influence consumers' purchase intentions while environmental contributions by corporations did not significantly influence their consumer behavior. They also discovered that consumers' understanding of CSR activities affect their purchase intentions. Therefore, it should be worthwhile for companies not only to invest in CSR but also to consider more efficient and effective tools for communicating about their CSR

activities to their consumers, especially about the environmental contribution activities. (Lee and Shin, 2010)

Even though the popularity of CSR has increased rapidly during recent years, social and environmental concerns are not novel as such. According to the United States Environmental Protection Agency (EPA), especially the Union Carbide's releases of toxic gases in the 1984 Bhopal, India disaster and a smaller chemical release in the following year in Institute, West Virginia, increased public's demands for information on toxic releases outside the companies. As a response, the Congress established Toxic Release Inventory (TRI) under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). It was expanded further in 1990 in the Pollution Prevention Act of 1990. TRI is a publicly available database containing information on toxic chemical releases and other waste management activities in the United States. By the end of 19th century, governments around the world had understood the requirement for environmental regulation in the form of mandatory information disclosure.

Cohen and Santhakumar conducted a theoretical analysis on the power of information disclosure as environmental regulation in 2007. They concluded that information disclosure is likely to be more effective in reducing pollution when the cost of collective action is low and relative income of the public is high. Konar, Shameek, and Cohen studied information as means of regulation already in 1997, and found that new information concerning a firm's toxic emissions that has a significant effect on market valuation is likely to lead to the firm to notably reduce subsequent emissions or otherwise to improve its environmental performance. My assumption is that if ESG-news releases significantly impact the stock prices of companies, the threat of media attention on ESG related crimes could also function as a disciplinary mechanism.

The reputational aspect of ESG applies also to "white collar" crimes. It has been empirically shown by Marciukaityte, Szewczyk, Uzun, and Varma (2006) that improvements in internal control systems following accusations of corporate fraud help repair a company's damaged reputation and reinstate confidence in the company. Market-based reputational costs of fraud were sufficient enough to change the composition of the board- in that sense court-induced costs are unnecessary. Consequences for individual managers responsible for criminal activities such as financial misrepresentation of firm's books are generally severe. In addition to criminal charges and fines they often face, they can lose their jobs and be barred from similar employment with other companies.

Karpoff, Lee, and Martin (2008) found that the likelihood of being laid off is positively related to the size of the misconduct's harm to shareholders and the quality of the firm's governance. There is a positive correlation between board's independence and the likelihood of the fraudulent manager getting fired. In general, negative publicity would thus seem as something worth avoiding and when proactive measures fail, corrective actions are required to restore the situation.

2.2 Stock performance of ethical stocks- a good investment?

In the context of this study, reportage of a negative ESG event would indicate unethical behavior and thus label the company as unethical. The short- and long-term performance of such companies is interesting especially to their investors. To date, there have been multiple studies on the relative performance of ethical stocks and funds, but no worldwide consensus has been reached on whether or not they are financially sensible investments.

Empirical studies have been conducted with different methodologies, timeframes, and data and the results have been mixed. For example, Schröder (2004) claims that, according to most studies by 2004, SRI funds have similar performance with conventional funds, whereas Barnea and Rubin (2010) found a positive relation between CSR ratings and financial performance. Meanwhile, Geczy, Stambaugh and Levin (2006) are convinced that investors pay a price for investing in socially responsible mutual funds. Theoretically, it is possible to justify all three alternatives: similar stock performance, and under- or out-performance.

Even though investors often expect "good" companies (meaning e.g. ethically responsible) to provide superior returns, conventional asset pricing theory disagrees. According to the theory, any good characteristic- such as low leverage- that is priced by the market is associated with lower instead of higher return expectations, because a good rating in the characteristic causes a decrease in the required return, which will lead to a higher current stock price and a lower future return on average. Then again, a characteristic not priced by the market, such as a firm's profit margin, would impact the current price, but it doesn't have a systematic impact on future returns. (Kaustia et al. 2009)

How the market perceives sustainability and social responsibility is closely related to how the market reaction to ESG-related news. This chapter briefly reviews the contradicting results of some of the previous studies on profitability of socially responsible stocks and funds.

2.2.1 Evidence of underperformance

Brammer, Brooks, and Pavelin (2006) examined the relation between corporate social performance and long-term stock returns with UK data and came to the conclusion that companies scoring high on CSR appear to be poor investments. Specifically, they studied social performance scores on three different criteria employment, environment, and community. Their analysis showed that companies with high scores over all three investment horizons (of 1, 2, 3 years) have considerably lower average returns than the benchmarks and that financially meaningful yet statistically insignificant abnormal returns can be achieved by holding a portfolio of the socially least desirable stocks.

Similarly, Boulatoff and Boyer (2009) studied the performance of environmental stocks. Their results suggest that, on aggregate, NASDAQ performed better than green firms. However, since environmental industries are growing, Boulatoff and Boyer believe their results may improve in the long run. Currently, solar, wind and water industries are already leading NASDAQ. (Boulatoff 2009)

Geczy, Stambaugh and Levin (2006) evaluated whether investors pay a price for investing in socially responsible mutual funds and found the key factors to be the fraction of their portfolios restricted to SRI funds and their prior beliefs about pricing models and manager skills. When the investor believes in multifactor models (like Fama-French, 1993) or when s/he believes that fund managers have skill, then the costs of SRI can be economically significant. SRI constraint can impose diversification costs. Investors who believe in fund managers' stock-picking ability, search return histories to identify such skill, but they incur costs because the funds with the best track records are not included in the investment universe of SRI funds. The costs for investing in SRI funds are especially high when the investor allocates his entire portfolio to those funds, but substantial also for an investor who allocates only a third. Mutual funds from broader fund universe reach closer to the size and value factors of the optimal portfolio identified by Fama-French model compared to SRI funds. Therefore, taken that the investor relies on these multifactor models, s/he will endure costs also in this perspective. (Geczy et al., 2006)

Renneboog, Horst, and Zhang (2005) investigated whether or not money-flows can predict future fund performance. They found that SRI funds with better past returns or higher return rankings attract 30% higher money-inflows, while the flow-performance relation is weaker when past performance has been poor. According to their study, SRI investors are not sensitive to past risks or to the fund fees. The future performance of SRI funds is worse for funds that attract more money-flows and for large funds. Therefore, Renneboog, Horst and Zhang claim that SRI investors chase

past returns and are unable to select funds that will generate superior performance. Overall, they believe socially responsible funds generate lower returns than conventional funds, but high screening intensity is likely to improve the returns of SRI funds. (Renneboog et al.)

2.2.2. Evidence of similar performance

Some studies, for example by Schröder (2004) and Kreander et al. (2005), and Shen and Chang (2009) support similar performance hypothesis. Michael Schröder compiled his dataset of the major SRI investment funds from the United States, Germany and Switzerland. He concluded that SRI funds that face screening seem to have no clear disadvantage compared to conventional assets. He found no difference between the risk-adjusted performance of SRI and conventional assets and thus, on average, the restricted investment universe doesn't result in a significantly lower performance. However, he points out that the investment strategy of SRI funds differs from conventional funds in the sense that they have an overweight in low market capitalization companies. Also Kreander, Gray, Power and Sinclair (2005) evaluated the performance of ethical and non-ethical funds by matched pair analysis. They used the Financial Times World Index (FTWI) that includes securities from 29 countries and, like Schröder, came to the conclusion that there is no difference between ethical and non-ethical funds according to the performance measures of risk adjusted Sharpe, Treynor, Jensen, and size adjusted two-index approach.

In their fairly recent study, Shen and Chang (2009) examined the effect of CSR on firm's financial performance in Taiwan. Their results were mixed but in general, suggest that adopting CRS at least does not deteriorate the performance of firms. Shen and Chang also used a matched-pair analysis but with four criteria: The nearest-neighbor matching, the caliper matching, Mahalanobis metric matching, and Mahalanobis metric matching with caliper.

2.2.3. Evidence of out-performance

To add to the confusion, there are several studies that show empirical evidence of socially responsible funds and stock out-performing conventional stocks e.g. Konar and Cohen (2001), Statman (2000), Cheung, Tan, Ahn, and Zhang (2010). Konar and Cohen found evidence suggesting that there is a significant and positive relationship between environmental performance and the intangible asset value of publicly traded firms in the S&P 500, which they interpret as a sign that the market values environmental performance and companies are rewarded for taking environmentally responsible actions. They extended the standard economic technique of decomposing a firm's market value (based on Tobin's q) into its tangible and intangible assets (MV= VT+VI) by separating out environmental performance from the intangible assets of the firm.

Meir Statman (2000) compared the performance of the Domini Social Index (an index of socially responsible stocks) and the S&P 500 index by comparing returns, calculating Jensen's alphas and a modified version of Sharpe ratio called "excess standard-deviation-adjusted return" (eSDAR). The socially responsible mutual funds performed better than conventional mutual funds over the period of 1990-1998, but the differences in their risk-adjusted returns are not statistically significant (Statman, 2000).

If socially responsible investors suffer from limited investment universe, sin stocks (i.e. of companies promoting or manufacturing alcohol, tobacco, or gambling) suffer from limited potential investors. According to Hong and Kacperczyk (2007) sin stocks are less held by norm-constrained institutions such as pension plans as compared to mutual or hedge funds, and they also receive less coverage from analysts than do stocks with otherwise comparable characteristics. Hong and Kacperczyk's study showed that there is a societal norm against funding operations that promote immorality, or more precisely, a price effect of 15-20% for sin stocks for being excluded by large institutional investors. The cost of capital of sin stocks is higher because the norm-constraint institutions neglect them. In addition, their expected returns are higher, since the litigation risk is higher for sin stocks. Therefore, based on Hong and Kacperczyk's study, the market value of non-sin companies is higher, and at least not unethical would seem desirable.

It should be taken into consideration that empirical results on the effects of social norms are likely to represent the lower bounds, because many companies of sin industries are aware of the cost of sin, such as the aforementioned neglect by institutional investors, and stay private for this reason (Hong and Kacperczyk, 2007).

The importance of CSR in Asian Emerging Markets was also studied by Cheung, Tan, Ahn, and Zhang in 2010, but in contrast to findings of Shen and Chang (2009), they found a significant positive relation between CSR and market valuation among Asian firms. Whereas Shen and Chang concentrated on companies listed in the Taiwan Stock Exchange, Cheung et al. included major firms listed in the Asian Emerging Markets in their dataset. Broader dataset can lead to different results, especially when the sample comprises of companies from different markets.

2.2.4 No consensus reached so far in literature

To conclude, the relative material benefits from investing in SRI funds or stocks instead of traditional funds or stocks remain speculative. To date, there has been no universally accepted perception on the subject. Naturally, there are positive, immaterial externalities encouraged by

ethical and responsible behavior of corporations that support the preservation of our planet and support humanity. My approach to studying how investors perceive CSR differs from the existing studies, especially regarding the time span. In this research, I will study whether investors believe negative ESG news affect the value of the company in question in short (± 5 days) and long term (3 years). Therefore, my focus is on the market reaction to the reporting of the event in print media and how it affects investors' perception on the company in long-term. Market value of a company can change either because the unethical actions change the intrinsic value of the company or simply because investors' believe they do. In addition to or instead of the irresponsible behavior, the intrinsic value of the firm can be affected by the consequences of the publication of the actions, such as loss of business or filing of lawsuits.

2.3 Stock performance after ESG related event

There are previous event studies on the stock performance following an ESG related events such as accusations of corporate fraud, filings of class-action lawsuits, and initial press announcements containing allegations of an environmental violation. However, the studies have focused mainly on short-term market effects of negative ESG events and the results have been mixed- the empirical evidence supports both negative impact and no-impact hypotheses. Committing fraud often leads to both market-based reputational costs as well as court-induced costs. Reputational costs potentially arise from both loss of business and fall in stock price, which are caused by investors' belief of the fraudulent company committing further crimes in the future (Marciukaityte et al.). In this chapter, the main findings of some of the existing studies are briefly presented and discussed.

2.3.1 Studies on environmental incidents

In addition to accidents, environmental incidents cover also cases such as pollution, bad green ratings, and toxic releases. Several previous studies have investigated good and or bad environmental (EV) news and effects on stock price (e.g. Diltz, 2002, Klassen and McLaughlin, 1996, Dasgupta et al., 2001, Gupta and Goldar, 2005, Konar and Cohen, 2001). The review of Margolis and Walsh (2001) of 13 EV event studies summarizes well how mixed and confusing the existing evidence is: They found six studies documenting positive relation, three claiming negative relation, one with both positive and negative relation, and three studies documenting no relation (Lundgren and Olsson, 2010).

The Toxic Release Inventory (TRI) -introduced earlier- revealed company specific pollution data initially in June 1989. For example Hamilton (1995) has studied whether the pollution data were news to journalists and investors. He defined news as the extent to which the TRI data deviated

from expectations about a firm's pollution patterns. He found evidence that most companies did not receive media coverage in the general interest publications. However, the higher the pollution levels were, the higher was the probability of receiving media coverage. On the other hand, the TRI data did provide news to investors. The average abnormal return on the day TRI information was published was significantly negative. As with media coverage and pollution level, the number of different chemical submissions reported by the firms induced a larger the drop in stock value. Applicable both to journalists and investors, the more information available about the firms' historical pollution habits, the lower was the effect of the publication. (Hamilton, 1995)

Karpoff, Lott, and Wehrly (2005) studied the stock market effects of press announcements of environmental violations. Based on their study, Karpoff, Lott, and Wehrly claim that news about an environmental violation is costly to firms, and the stock value losses are similar regardless of the type of the environmental harm. They found that the initial press announcement in specific caused a significant stock price reaction- an average two-day abnormal return of -1.69%. However, these losses in market value correspond to the company's legal penalties and therefore market induced reputational penalties are trivial. This evidence is contradicting to the findings of Marciukaityte, Szewczyk, Uzun, and Varma (2006) above, which showed no significant stock price reaction. It should be considered, however, that environmental violations differ from other types of fraud in that firms violating environmental regulations typically do not directly harm their stakeholders such as customers, employees, and suppliers. This might explain why reputational penalties are higher for e.g. corporate governance problems. (Karpoff et al., 2005)

Tommy Lundgren and Rickard Olsson extended prior research by conducting a short-term event study on environmental (EV) incidents (event period 2003-2006) from four different geographical areas; Global (entire sample of 142 incidents), US, non-US, and Europe. They examined whether bad news affect firm value negatively as measured by abnormal returns and discovered that negative events are generally associated with negative returns, but which proved to be statistically significant only for European data. This would suggest that firm's stakeholders have different views on EV in Europe and the US. They also investigated the relationship between incident induced effects and EV risk rating, and found evidence implying that higher EV risk (low goodwill) is associated with greater loss of firm value compared to firms with low EV risk (high goodwill). Lundgren and Olsson explain these results by high EV risk companies being subjected to more severe EV incidents. (Lundgren and Olsson, 2009)

In their study in 2010, Lundgren and Olsson improve their earlier study (2009) by e.g. using new index and factor data, non-parametric test statistics, additional normal return models including exchange rate factors, Fama-French factors, etc. in their event study on the same event dataset. However, their results were quite insensitive to the variations in methodology, and overall, their findings supported those of their earlier study. (Lundgren and Olsson, 2010)

2.3.2 Studies on Social incidents

The Dow Jones Sustainability World Index (DJSI World) comprises more than 300 companies that represent the top 10% of the leading sustainability companies out of the biggest 2500 companies in the Dow Jones Global Total Stock Market Index. The DJSI World is reviewed annually, but there is also an ongoing review of the DJSI World screening extraordinary corporate actions, such as delisting, bankruptcy, merger, or major changes in the corporate sustainability performance, that could affect the composition of the index.

In 2010, Adrian Cheung analyzed the impacts of index inclusions and exclusions on corporate sustainable firms by examining the 60-day returns of US stocks added or deleted from the DJSI World between years 2002-2008. He observed no strong evidence that announcements as such would have any significant impact on stock return or risk, and so he concluded that the event announcement does not carry information and any shift in demand is temporary. On the day of the announcement of inclusion or exclusion from the index, stock returns altered significantly, increased in case of inclusion and decreased after exclusion, but this variation quickly evened out. Similarly, liquidity deteriorates after the announcement, but soon bounced back. (Cheung, 2010)

The connection between layoffs and stock prices as well as corporate performance has been studied by for example Farber and Hallock (2009) and Chen, Mehrotra, Sivakumar, and Yu (2001). More specifically, Chen et al. studied the stock market and earnings performance as well as operating performance (measured by profit margins and labor productivity) before and after layoff announcements published in Wall Street Journal 1990-1995. They found that layoffs are preceded by a period of poor stock and operating performance and followed by improvements in both. Also, they found that layoff announcements are followed by a significantly negative stock market reaction of, on average, -1.2% (two-day abnormal return). Chen et al. observed an increased corporate focus and concluded that layoffs are part of an overall corporate restructure to increase profitability. These restructures respond to shifts in demand in the product market and consequential decline in performance. Therefore, despite of the initial drop in the stock price, the long-term performance of the company as well as shareholders' wealth increase in the longer-term. (Chen et al. 2001)

Farber and Hallock (2009), on the other hand, studied how the relationship between layoff announcements and stock prices has changed over time during the time period 1970-1999. They found evidence that the stock market reaction has become less negative over the years. They explain this phenomenon by the fact that layoffs intended to improve efficiency are more common relative to those meant to reduce over capacity related to reductions in product demand. In other words, the layoff announcement as such is not automatically an indication of a troubled company and not always bad news for the investors. And even in situations where the company is in trouble, according to Chen et al., its performance is likely to improve after the layoff. (Farber and Hallock, 2009)

2.3.3 Studies on corporate governance incidents

Marciukaityte, Szewczyk, Uzun, and Varma (2006) examined whether the costs of corporate fraud induce changes in the accused company's internal control system. They focused on changes in the board structure, especially on the proportion of outside directors, as the changes are presumably intended to enhance monitoring. Their sample consisted of companies charged with government, financial reporting, or stakeholder fraud or regulatory violation in the US during 1978-2001. The main finding of the study was that improvements in internal control systems certainly followed accusations of fraud, which indicates that the market-based reputational costs were high enough to have this impact. Legal penalties are thus unnecessary for prompting a change in the board of directors. Making changes to the board structure helps repair a company's damaged reputation and reinstate investors' confidence in the company. The market reacted negatively to the accusations, but the abnormal returns were statistically insignificant for both short- and long-term. Marciukaityte et al. also studied the long-term effect of accusation on the accused company's operating performance, but found none. To sum up, the effect of the accusation of fraud extends only to the changes in internal control systems. (Marciukaityte, Szewczyk, Uzun, and Varma, 2006)

The duty of loyalty requires managers to act in the best interests of the corporation and not in the person's own best interest, and the duty of care requires managers to execute reasonable skills, and diligence in their actions. If the duty of care is being violated, shareholders can initiate lawsuits. Bauer and Brown (2010) analyzed various types of allegations brought forward in class-action lawsuits and their short and long-term effects on shareholder value. Opposite to Marciukaityte et al., Bauer and Brown found that shareholder litigation can lead to transformation of company characteristics and risk exposures as well as negative short- and long-term performance effects. The consequent stock price recovery depends on the type of the allegation, the time horizon, and the

estimation technique for long-term performance. Bauer and Brown conclude that the economic and financial effects of allegations that involve companies as a whole can be substantial. Interestingly, they observed a significant drop in the share price right before the filing of the lawsuits, indicating perhaps of rumors. According to the empirical evidence, on average, shareholder litigation does not seem to pay off in terms of stock recovery, as after a slight recovery, stock prices will continue to gradually decline.

2.3.4. Expanding existing literature

The studies discussed above have been conducted mainly on US data (apart from Lundgren and Olsson) and thus studying ESG events' effects in European markets will further shed light on investors' reaction to ESG news and complement the existing literature. Even though there are studies using fairly recent data (e.g. A. Cheung, 2010, data from 2002-2008), how the market reaction to news has changed has not been previously studied. Moreover, from the aforementioned studies, only Bauer and Brown studied both short- and long-term effects. From a company's point of view, when deciding on whether to behave socially responsibly, the long term effects of press announcements of misbehavior are more relevant than event day stock price movements.

2.4 Market efficiency and stock returns

The mixed empirical results from previous studies could also be explained by the traditional Efficient-Market Hypothesis (EMH). In the early sixties, Eugene Fama developed the efficient-market hypothesis. The efficient-market hypothesis states that financial markets are efficient information-wise, which means that one cannot consistently achieve excess returns relative to average market returns on a risk-adjusted basis given the information available at the time the investment is made. The hypothesis implies that stock prices reflect all public information and instantly adjust to reflect any new information and thus provide the best possible estimate for the underlying value of listed companies.

In his paper (1997), Eugene Fama argues that the existing studies on long-term stock return anomalies actually support the efficient-market hypothesis, even though one might intuitively think the opposite. In an efficient market, underreaction to an event should be as frequent as overreaction. According to Fama, the existing anomalies can be roughly evenly split in overreaction and underreaction. He also states that most long term return anomalies can be attributed to chance, since they are very sensitive to methodology. The anomalies tend to become marginal or disappear when measured with different methodologies and techniques. (Fama, 1997)

However, empirical analyses have consistently found problems with the hypothesis. Behavioral finance economists suggest cognitive biases and irrational behavior, which leads to inefficiencies in the market. Behavioral economists believe that the irrational behavior creates market breakdowns and buying opportunities for savvy investors. Richard H. Thaler, a behavioral economist, for example, says stocks can underreact to good news because investors are wedded to old views about struggling firms. The debate is ongoing, but the efficient-market hypothesis has become more difficult to defend. Since the nineties, even Fama himself has admitted that stock prices could become somewhat irrational (Hilsenrath, 2004).

3. Hypotheses

3.1 Short-term market reaction hypothesis

The main objective of this research is to learn whether or not negative ESG news affect companies' stock returns. The market reaction (or no-reaction) will imply how investors' perceive and value corporate social responsibility. Based on the previous studies on stock performance after ESG related event, a negative market reaction is more plausible than a positive reaction, but the significance of the previous findings has varied (e.g. Marciukaityte et al., Cheung, Hamilton, and Karpoff et al.). The short-term market reaction hypothesis (H1) is derived from this research problem:

H1: Negative ESG related company specific news induces a significantly negative reaction in stock returns in the short-term.

3.2 Long-term market reaction hypothesis

Next, the attention is directed to the extent of the (possible) market reaction. Examining abnormal returns over different length event windows is also informative about the post-event recovery process of the stock performance. Both positive and negative long-term effect can be justified ex ante as described earlier. Thus the long-term market reaction hypothesis (H2) diverges into two sub-hypotheses addressing this aspect:

H2a: The effect on stock returns of the ESG news is significantly negative in the long-term.

H2b: The effect on stock returns of the ESG news is significantly positive in the long-term

3.3 Evolution of the market reaction hypothesis

As the sustainable investment and CSR themes have become increasingly popular and acknowledged recently, it is of interest whether or not the market reaction to ESG news has changed during the past decade. Based on the previous studies on CRS trends (e.g. Lougee and Wallace, 2008), my assumption is that as investors' awareness and interest toward ethical behavior has increased, also their reaction toward negative press announcements has become stronger. From this assumption follows the evolution of the market reaction hypothesis (H3):

H3: The market reaction to ESG related news has changed over time.

4. Data description and sources

4.1 Event data

The ESG news data was collected case by case from LexisNexis news database. It should be noted that I used ESG incident reporting dates, not the actual incident dates. I formed a sample of news relating to companies listed in various European stock exchanges: The London Stock Exchange, the Frankfurt Stock exchange, NYSE Euronext, Euronext Paris, Euronext Amsterdam, the Swiss Stock Exchange, OMX Stockholm, OMX Helsinki, Oslo Stock Exchange, Milan Stock Exchange, and Borsa Italiana.

All collected articles relating to corporate governance had been published in The Financial Times London Edition during the time period of 1998-2007. For social news, most were collected from The Financial Times as well, with a few exceptions collected from the Wall Street Journal. The rationalization for the choice of source is that The Financial Times is a prestigious and widely distributed newspaper and in published in English and thus reaches many investors.

The environmental news articles were the most challenging to find. Because of the scarcity of such news in the Financial Times and Wall Street Journal (from which 30% of the environmental news sample was collected), environmental news were collected also from other sources, more environmentally conscious newspapers, such as Greenpeace International and Environment News Service. Environmental violations often take place in the developing countries, in areas of high the production, drilling, or mining concentration. It is speculative what proportion of the number of environmental violations occurring ever get reported and whether the news reach European markets. It would appear from the lack of press releases about environmental misconduct for example in the

Financial Times that many companies manage to cover up their unethical behavior and hide it from their investors.

Since no comparative study to this research had been conducted before, the criteria for the news selection process could not be replicated from a previous study but had to be created for the data gathering. In creating the criteria and especially the search terms, I collected and combined a list of types of crime or keywords used in previous studies on corporate misbehavior relating to environmental, social, and governance issues. For example, Karpoff, Lott, and Wehrly (2005) studied the reputational penalties for environmental violations, and the types of violations included in their study were used in this study as search terms for environmental violations. Similarly, I utilized the terms related corporate governance used in the studies of Marciukaityte, Szewczyk, Uzun, and Varma‘s, who categorized corporate fraud into stakeholder fraud, government fraud, regulatory violation, and financial fraud, as well as Bauer and Brown (2010), who studied separately stock price manipulation, accounting fraud, illegal business practices, Insider trading, false/misleading statements, SEO, IPO, or acquisition related, and governance problems.

Table 1: Criteria for news selection process

Criteria for news selection	
Subject of the headline:	Report/allegation of misbehavior/crime/neglect/unethical behavior by a company or its management
Requirements for the company:	Publicly listed in Europe
Publication time:	January 1st 1998- December 31st 2007
Source:	A prestigious newspaper with wide distribution, published in English
Search terms:	
Environmental	• Toxic/hazardous/radioactive waste/spill/leak/emission/release • Water/air pollution • Contamination
Social	• Child labor • Strikes • Lay-offs • Sexual/racial/age harassment/discrimination
Governance	• Allegation, accusation, claim, charge • Crime, neglect, fraud • Tax fraud, accounting fraud, embezzlement

The total sample of cases from 1998-2007 was further divided and assembled into smaller subsamples based on the news category and time period of publication. Therefore, the six assemblies of samples studied separately were: 10 year sample, 5-year period of 1998-2002 sample, 5-year period of 2003-2007, environmental sample, social sample, and corporate governance sample. The total sample size was 123 cases. The subsample size for each ESG category is approximately 40 news articles, and for the 5-year samples approximately 60 cases per sample. In each case, the focus was on the initial announcement of the misdemeanor in the print media. This is justified by the assumption of the market reaction being the strongest for the initial announcement. Naturally it is likely that news about an event reach some investors a little quicker e.g. through

Reuters and Internet. This is taken into account in the short term regressions by studying also the five days preceding the event.

For the news article about an ESG event to be included in the sample it needs to have been selected by the newspaper editorial staff to perceive the event as newsworthy and publish the news. It could be argued that there is a selection bias present in the ESG-event sample. Selection bias, also called the selection effect, is a statistical bias which refers to an error in choosing the events to take part in a scientific study. It can lead to a distortion of a statistical analysis, which results from the method of collecting samples. The selection bias should be corrected for in order to ensure the validity of the results and the conclusions drawn from them. In this study, the bias in question could be the sampling bias, which is a systematic error due to a non-random sample of a population that results in some members of the population to be less likely to be included than others. In this biased event sample of a population (of events) all events are not equally balanced or objectively represented.

However, the purpose of this study is not to study the markets' reaction to the event itself, but to the reportage of it. Therefore, it will not lead to a biased sample that events that don't reach the most prestigious print media are not included in the sample. Selection bias related to the selection process of the news for this study is mitigated by the use of the aforementioned criteria.

Examples of news articles for all three categories can be found from the appendix (11.1).

Figure 3: Division of samples into subsamples

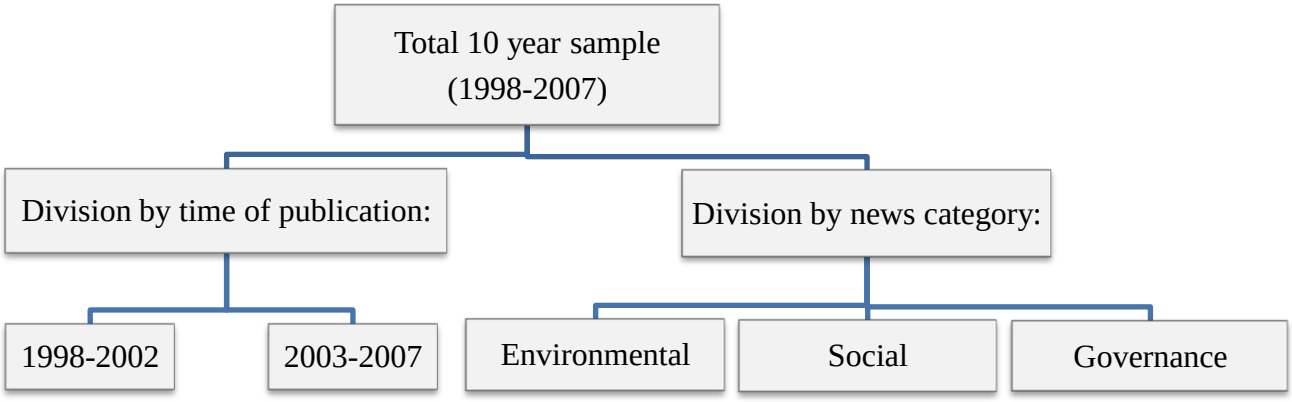
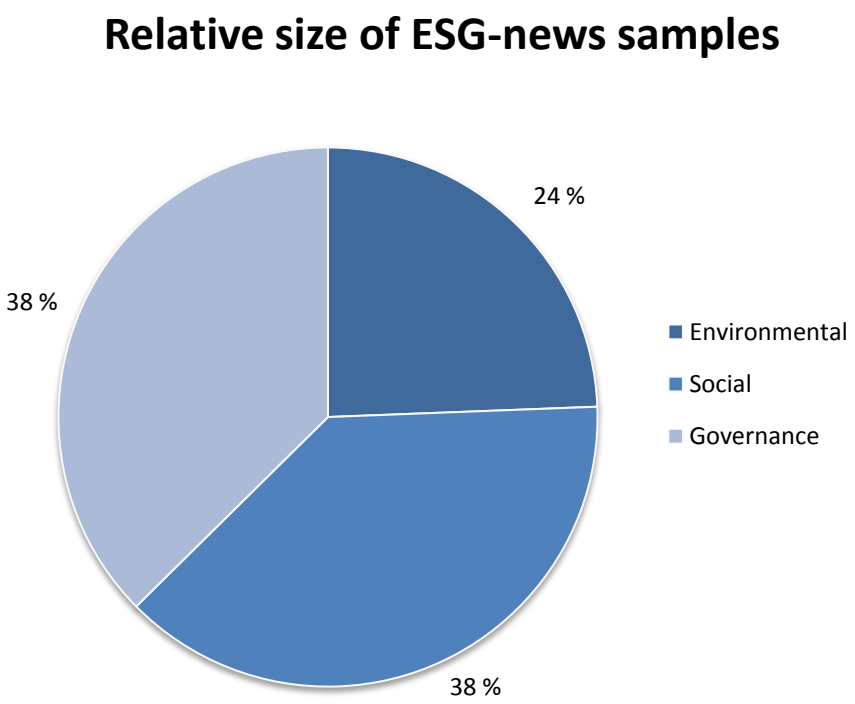
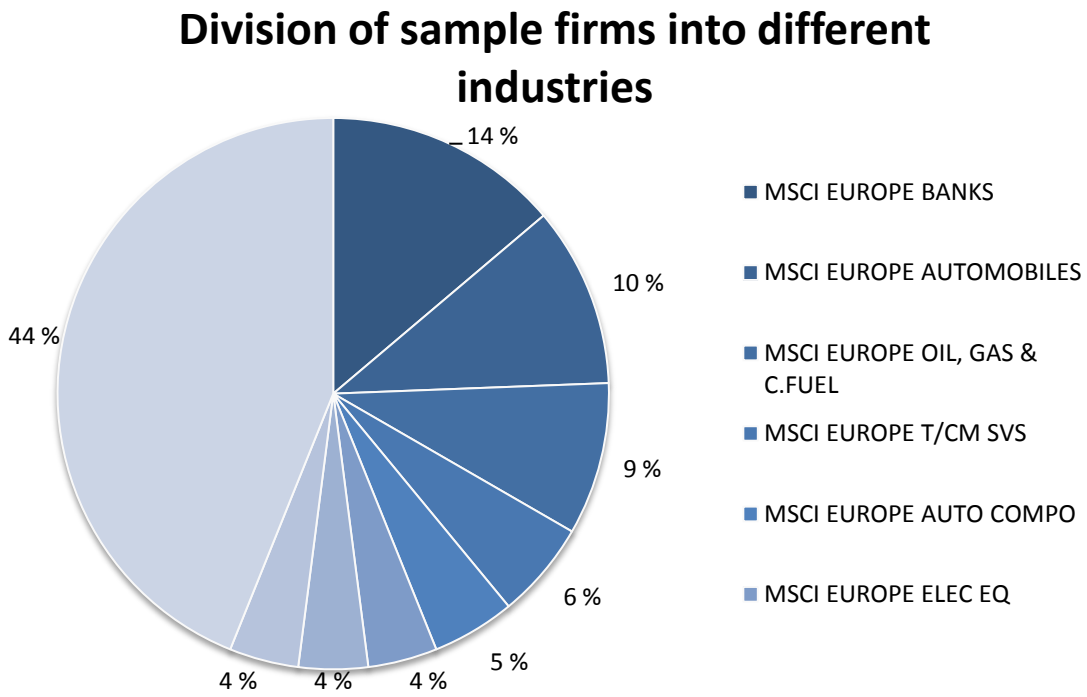


Figure 4: Relative division of news sample into ESG- categories



Note: The size of the total sample is 123 ESG-news.

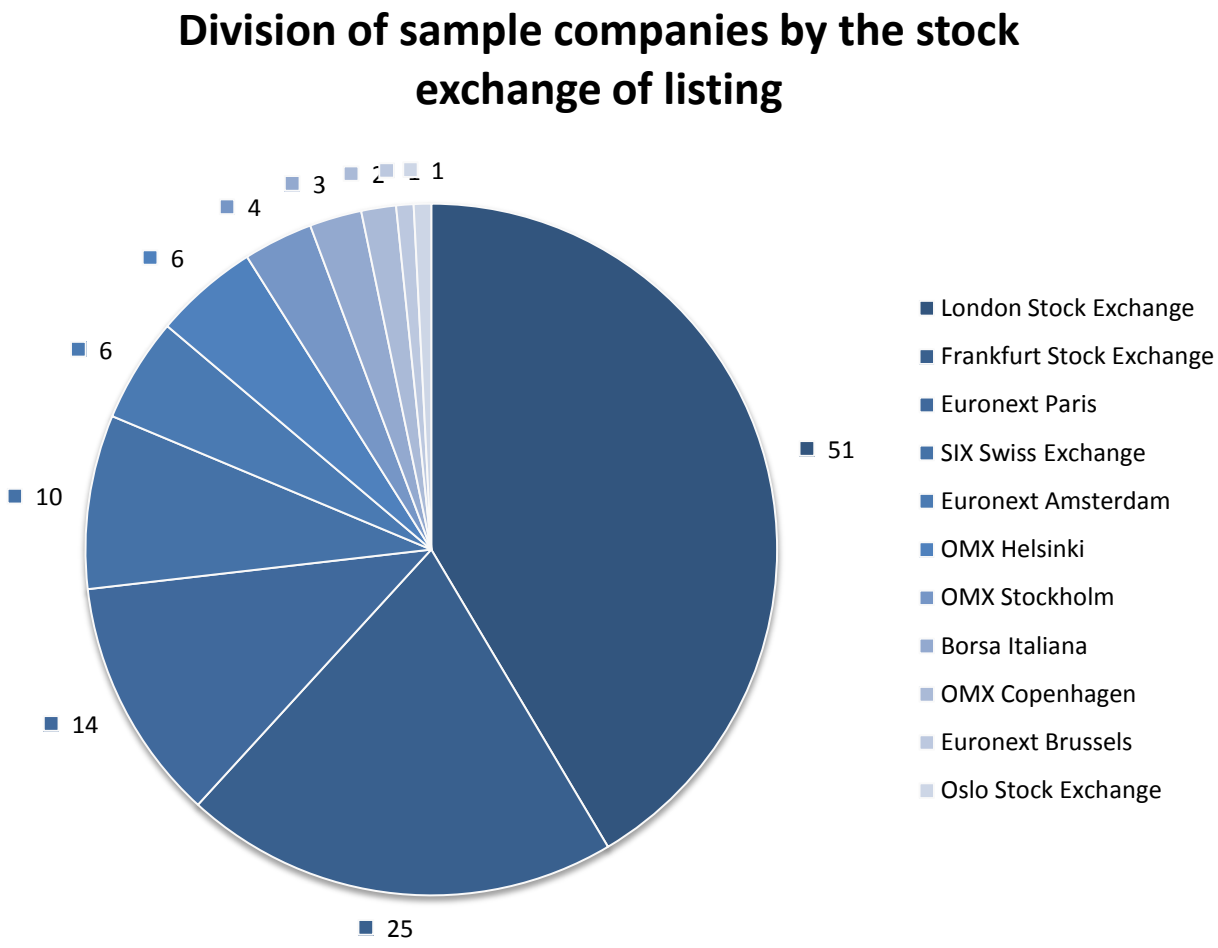
Figure 5: Division of sample firms into different industry sectors



Note: The group "other" consists of 22 MSCI Sector Indices which represent industry sectors in the sample represented by four or less companies.

Figures 5 and 6 shed light on the underlying companies of the ESG news included in the sample. I have matched a MSCI Sector Index for each company base on their SIC (industry) codes and so I used the division of companies into the indices to illustrate which sectors are present in the sample (Figure 5). As apparent from the pie chart, the ESG news collected address companies widely from different industries (30 sector indices). Banks, automobile industry, and oil industry are the most common industries, represented by 33% of the sample companies.

Figure 6: Division of sample firms by the stock exchange of listing



Note: The numbers in the pie chart represent the number of companies in the sample listed in the particular exchange.

All sample cases reported of companies that were listed in European Stock Markets at the time of the news reportage. Figure 5 illustrates the division of sample firms by the stock exchange of listing. Clearly, and predictably, the London Stock Exchange, the Frankfurt Stock Exchange, and the Euronext Stock Exchanges are most common exchanges of listing across the sample, as they are across Europe as well. It should be noted that the names of the stock exchanges are written as their

current official names. Due to mergers and acquisitions of stock exchanges during the past ten years, the ownership and official names of exchanges have changed. Nevertheless, the country of listing at the time of the event for all sample firms was the same as according to the current exchange (e.g. Helsinki Stock Exchange has become OMX Helsinki). A complete list of companies included in the sample as well as their industry sector and stock exchange of listing can be found from the appendix (11.2).

4.2 Stock market data

The daily stock return data was retrieved from Thomson Reuters DataStream in the form of "total returns raw", which is an index-like measure of total returns (starting from 100 on the day of listing) that include the return on stock as change in value as well as dividends. I computed daily continuously compounded logarithmic returns using the following formula:

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

In equation (1), r_t and r_{t-1} represent the total return by the date t and t-1 respectively. I used the logarithmic returns for their symmetry; the negative and positive percent returns are equal unlike with arithmetic returns. Logarithmic returns are also time additive unlike simple returns. Logging helps to reduce the effect of any skewness in the return distribution. This is why the logarithmic returns are commonly used in academic research, especially in time series analysis. The logarithm filters out the fundamental issue of interest more clearly for examination, which in this case is the fluctuation of returns. However, when forming the portfolio returns by taking averages of daily returns of companies in the portfolio, I used simple returns, as it is not mathematically appropriate to take averages of logarithmic returns. Simple returns are calculated as follows:

$$R_t = \left(\frac{r_t - r_{t-1}}{r_{t-1}}\right) \quad (2)$$

Again in equation (2), r_t and r_{t-1} represent the total return by the date t and t-1 respectively. Where I needed to convert simple returns to logarithmic returns or vice versa I used the following equations:

$$Simple\ return = EXP(Logarithmic\ return) - 1 \quad (3)$$

and

$$Logarithmic\ return = LN(simple\ return + 1) \quad (4)$$

4.2.1 Market indices

As proxies for the European market and different industries I used the MSCI (Morgan Stanley Capital International) indices, more specifically, the MSCI Europe and 36 different MSCI Sector Indices. Since the Euro was not in use at the beginning of the time period under study, I used US dollar indices in order to have all indices consistently of the same currency. Since the focus is on the percentage difference in returns, the currency is irrelevant and doesn't have to be the same between the benchmark and the sample portfolio.

The use of market and sector indices controls for economy-/industry-wide events and filters out the price effects induced by them and thus makes it easier to define price variation due to ESG events. I matched a sector index for each sample firm by using their SIC codes to define which industry they operate in. Conducting the quantitative analysis with this alternative reference portfolio in addition to the matched control sample (see 4.2.2) will serve as a robustness check and bring more depth to the analysis.

4.2.2 Matched sample data

A matched control sample was formed in order to control for industry specific factors as well as to avoid the survivor bias, the rebalancing bias, and the problem of cross- correlation in long-term event studies (discussed in more detail in section 5.2.1). The control firm approach eliminates the new listing bias as both the sample and control firm must be listed in the identified event month. It also solves the rebalancing bias since both the sample and control firm returns are calculated without rebalancing, and the skewness problem since the sample and control firms are equally likely to experience large positive returns.

The matched sample consists of otherwise similar firms, but of which no ESG related news of crime had been published at that time. I matched company pairs based on specified firm characteristics of the sample company at the time of the event: The SIC (industry) Code, the market cap (size), listing continent (Europe), and currency (€). The best match was considered to be the company whose aforementioned characteristics were the most similar to the sample firm. In the search of the best matches, I also used the list of competitors provided by Thomson One Banker for each firm in the matching process.

4.2.3 Summary statistics

Table 2: Summary statistics of 10 year sample portfolio returns

Summary statistics of 10 year daily simple returns on sample portfolios						
	Total	1998-2002	2003-2007	Environmental	Social	Governance
Mean	0.00018	0.00019	0.00018	0.00019	0.00030	0.00011
Standard Error	0.00022	0.00023	0.00023	0.00022	0.00023	0.00027
Median	0.00059	0.00032	0.00040	0.00042	0.00041	0.00029
Standard Deviation	0.01318	0.01333	0.01382	0.01326	0.01374	0.01606
Sample Variance	0.00017	0.00018	0.00019	0.00018	0.00019	0.00026
Kurtosis	7.31050	8.90384	5.50361	10.79338	14.76458	6.41263
Skewness	-0.04689	0.05965	-0.15241	-0.10230	0.08830	-0.03368
Range	0.21433	0.22540	0.19944	0.24650	0.32351	0.27149
Minimum	-0.10387	-0.11733	-0.09033	-0.13316	-0.15921	-0.11192
Maximum	0.11046	0.10807	0.10912	0.11333	0.16430	0.15957
Sum	0.60973	0.64894	0.64294	0.65167	1.05210	0.39065
Count	3479	3479	3479	3479	3479	3479
Conf. level (95%)	0.00044	0.00044	0.00046	0.00044	0.00046	0.00053

Notes: The daily simple returns have been calculated from the "total return raw"-data and thus include not only the change in prices but also dividends.

Table 3: Summary statistics of 10 year matched sample returns

Summary statistics of daily simple returns on matched sample portfolios						
	Total	1998-2002	2003-2007	Environmental	Social	Governance
Mean	0.00046	0.00050	0.00053	0.00085	0.00008	0.00029
Standard Error	0.00027	0.00029	0.00028	0.00032	0.00029	0.00022
Median	0.00076	0.00064	0.00067	0.00073	0.00043	0.00044
Standard Dev.	0.01612	0.01728	0.01680	0.01906	0.01693	0.01285
Sample Variance	0.00026	0.00030	0.00028	0.00036	0.00029	0.00017
Kurtosis	183.52255	26.37129	170.75729	142.63934	7.18756	4.02759
Skewness	3.32446	0.43367	3.02698	3.05153	-0.05826	-0.35609
Range	0.73627	0.47670	0.75713	0.80905	0.26613	0.14625
Minimum	-0.30647	-0.20065	-0.32063	-0.32805	-0.11554	-0.08363
Maximum	0.42980	0.27605	0.43650	0.48100	0.15059	0.06262
Sum	1.60793	1.75138	1.84193	2.97197	0.26612	1.01910
Count	3479	3479	3479	3479	3479	3479
Conf. level (95%)	0.00054	0.00057	0.00056	0.00063	0.00056	0.00043

Notes: Notes: The daily simple returns have been calculated from the "total return raw"-data and thus include not only the change in prices but also dividends.

Tables 2 and 3 present the descriptive statistics of the daily simple returns on the sample portfolios and the matched sample portfolios for the 10 year period (1998-2007). The daily simple returns have been calculated from the company specific raw returns that include the change in stock value and dividends. The portfolio returns have been calculated as daily averages of returns of the companies included in the samples. Total sample refers to the total sample that includes companies from all 123 cases and other portfolios are subsamples regrouped from the total sample.

Over all, the matched sample portfolio would seem more volatile in terms of daily returns as the range is wider (0.736 vs. 0.214) and variance is higher (0.00026 vs. 0.00017) than those of the total sample portfolio. Across samples, there is no significant difference between standard deviations or means (max. 0.03%- min.0.011%). The mean return is slightly higher for the matched sample portfolio than the original sample. However, the differences are minor.

However, regarding skewness and kurtosis the sample and matched sample differ somewhat. Positive skewness indicates that the probability of increases in returns is higher than decreases. The total sample skewness is approximately -0.047, while skewness of the matched sample is 3.33. The sign of the skewness varies also across samples. For the original samples, skewness is either slightly positive or slightly negative. For the matched samples, skewness is either slightly negative or notably positive.

Kurtosis indicates the "peakedness" of the probability distribution and therefore a low kurtosis distribution has a rounded peak and shorter, thinner tails while high kurtosis distribution would mean a sharper peak and longer, fatter tails. The kurtosis for the matched portfolio is significantly higher than for the original sample. This means that the Kurtosis risk is higher with the matched sample. The kurtosis risk means that the observations are spread wider compared to the normal distribution, which means that fewer observations cluster near the average, and more observations are placed in the extremes either far above or far below the average. However, since the matched sample is not used in the OLS regressions- which assumes normality of cumulative abnormal returns- this will not be an issue.

Table 4: Summary statistics of 3 year post-event daily returns on sample portfolios

Summary statistics of 3 year post-event daily simple returns on sample portfolios						
	Total	1998-2002	2003-2007	Environmental	Social	Governance
Mean	0.00058	0.00075	0.00050	0.00080	0.00032	0.00069
Standard Error	0.00012	0.00021	0.00015	0.00023	0.00014	0.00025
Median	0.00052	0.00034	0.00042	0.00059	0.00030	0.00026
Standard Deviation	0.00330	0.00588	0.00416	0.00627	0.00372	0.00695
Sample Variance	0.00001	0.00003	0.00002	0.00004	0.00001	0.00005
Kurtosis	34.67896	94.64219	4.02287	5.60848	-0.18867	98.37783
Skewness	3.05804	6.28508	0.49255	0.93321	0.10854	6.63204
Range	0.05170	0.11133	0.04217	0.06292	0.02188	0.13183
Minimum	-0.00934	-0.01504	-0.01725	-0.02413	-0.01036	-0.01761
Maximum	0.04236	0.09629	0.02492	0.03878	0.01152	0.11421
Sum	0.43256	0.56219	0.37803	0.60244	0.23778	0.52076
Count	751	751	751	751	751	751
Conf. level (95%)	0.00024	0.00042	0.00030	0.00045	0.00027	0.00050

Notes: The daily simple returns have been calculated from the "total return raw"-data and thus include not only the change in prices but also dividends.

Table 5: Summary statistics of 3 year post-event daily returns on matched sample portfolios

Summary statistics of 3 year post-event daily simple returns on matched sample portfolios						
	Total	1998-2002	2003-2007	Environmental	Social	Governance
Mean	0.00036	0.00050	0.00034	0.00074	0.00020	0.00029
Standard Error	0.00009	0.00014	0.00011	0.00016	0.00014	0.00015
Median	0.00026	0.00056	0.00028	0.00065	0.00004	0.00018
Standard Deviation	0.00236	0.00391	0.00315	0.00436	0.00392	0.00415
Sample Variance	0.00001	0.00002	0.00001	0.00002	0.00002	0.00002
Kurtosis	0.29554	0.43986	1.34083	0.56555	0.04128	0.33620
Skewness	0.12854	-0.03330	-0.01982	0.17611	0.01911	0.22564
Range	0.01754	0.02758	0.02794	0.03284	0.02217	0.02710
Minimum	-0.00655	-0.01340	-0.01297	-0.01512	-0.01147	-0.01080
Maximum	0.01099	0.01418	0.01497	0.01772	0.01069	0.01630
Sum	0.27407	0.37339	0.25709	0.55312	0.14915	0.21996
Count	751	751	751	751	751	751
Conf. level (95%)	0.00017	0.00028	0.00023	0.00031	0.00028	0.00030

Notes: The daily simple returns have been calculated from the "total return raw"-data and thus include not only the change in prices but also dividends.

Table 6: Summary statistics of 3 year post-event daily returns on MSCI Index reference portfolios

Summary statistics of 3 year post-event daily simple returns on MSCI index reference portfolios						
	Total	1998-2002	2003-2007	Environmental	Social	Governance
Mean	0.00033	0.00026	0.00041	0.00046	0.00028	0.00030
Standard Error	0.00006	0.00008	0.00009	0.00012	0.00010	0.00010
Median	0.00030	0.00027	0.00036	0.00040	0.00031	0.00034
Standard Deviation	0.00166	0.00229	0.00251	0.00320	0.00287	0.00277
Sample Variance	0.00000	0.00001	0.00001	0.00001	0.00001	0.00001
Kurtosis	0.38378	0.42607	1.23155	2.33699	0.63414	1.08224
Skewness	0.23429	0.28905	0.30900	0.27539	0.15417	0.06905
Range	0.01187	0.01575	0.01893	0.03332	0.02210	0.02262
Minimum	-0.00414	-0.00588	-0.00652	-0.01357	-0.01038	-0.00838
Maximum	0.00774	0.00987	0.01241	0.01975	0.01172	0.01424
Sum	0.24953	0.19772	0.30931	0.34803	0.21126	0.22438
Count	751	751	751	751	751	751
Conf. level (95%)	0.00012	0.00016	0.00018	0.00023	0.00021	0.00020

Notes: The daily simple returns have been calculated from the "total return raw"-data and thus include not only the change in prices but also dividends.

Tables 4-6 depict the summary statistics of the 3 year post-event daily returns on the sample portfolios and the reference portfolios compiled of the matched firms or matched indices. Sample variances are close to zero for all samples, perhaps slightly smaller for the reference portfolios. The reference samples are quite similar in terms of summary statistics: Mean (0.00033 vs. 0.00036), range (0.01187 vs. 0.01754) and standard deviation (0.00166 vs. 0.00236). For the original sample, the statistics are a somewhat higher.

Again, the most significant difference comes in form of skewness and kurtosis statistics. For reference sample, skewness and kurtosis are low and positive. For the original sample, the skewness and kurtosis are positive and significantly higher (3.06 and 34.68).

5. Methodology

5.1 Short-term event study to determine abnormal returns

A popular methodology of measuring the effect of an event from financial market data is the event study methodology. The event study has many applications and has been widely used in accounting and finance research in measuring the market value effects of both firm specific and economy wide events ever since the 1930s (MacKinlay 1997). For example, Brown and Warner based their studies on the event study methodology (1980, 1985) when examining the properties of daily stock returns and the effect of specific data characteristics in methodologies for assessing the share price impact on firm-specific events. In 1997, A. Craig MacKinlay studied the applicability of the event study methodology and his formulas are roughly followed in this research.

Conducting an event study begins with defining the events, the event windows, and the estimation windows. The event window refers to the time period over which the behavior of equity returns are examined. In order to define the normal behavior of returns, I used an estimation window of 120 days preceding the event window. There are several techniques for determining the abnormal returns such as the constant mean model and the market model. In this study I used the market model.

The purpose of this study is to measure the market reaction to different types of news at different times and not the market impact of a particular event on a particular stock. Therefore, after defining the abnormal returns over the event period for each stock, I formed portfolios by aggregating the daily abnormal returns for each sample and subsample. Thus, the analysis of the abnormal changes in returns is conducted on a portfolio level rather than per each case and each stock separately.

In this study, returns of the MSCI Europe index represent the market returns in the market model and are thus used in the estimation of the abnormal returns. Because the index returns were reported mainly on monthly basis until 2001, I conducted the short term event study (that focuses on daily returns) for a shorter time period of 2001-2007.

5.1.1 The market model

In this research a standard market model event study was conducted to measure the cumulative abnormal returns (CAR) induced by the press releases. The event period was ±5 days in order to analyze any short-term changes in abnormal returns as well as to observe whether a news release was anticipated (pre-event abnormal returns). The market model was defined separately for each case. The market model used is defined as follows:

$$r_{it} = \alpha_i + \beta_i r_{mt} \quad (5)$$

The r_{it} and r_{mt} in (5) refer to the period-t returns on stock (i) and the market portfolio correspondingly. The market parameters α and β were estimated by regressing the 120-day estimation period returns of the stock against the market returns (MSCI Europe) of that time period using the standard linear ordinary least squares (OLS)- regression. The OLS-technique minimizes the sum of squared distances between the observed responses in the data set and the fitted responses from the regression model.

The abnormal returns were defined as:

$$AR_{it} = r_{it} - \alpha_i - \beta_i r_{mt} \quad (6)$$

In (6) α and β are the estimated parameters from the regression model. After the event window abnormal returns were defined for each 123 cases, I calculated the ARs for the six samples by taking arithmetic averages of the daily abnormal returns for each ±5 days of all stocks included in the specific sample. Then I calculated the cumulative abnormal returns (CAR) and the corresponding variances and standard deviations for each sample for the event window period.

5.2.3 Conducting the hypothesis tests

Next step in the event study is to analyze whether the estimated abnormal returns due to the event are statistically significant. The hypotheses under examination are as follows:

H_0: The event has no impact on the stock returns (AR = 0)

H_1: The event has an impact on the stock returns (AR ≠ 0)

Under the H_0 the distribution of the cumulative abnormal return is:

$$CAR_i(t_1, t_2) \sim N(0, \sigma^2{}_i(t_1, t_2)) \quad (7)$$

In (7), *i* denotes the security, t_1 and t_2 denote the event period.

In order to test the hypothesis, the z-value is calculated using the following equation:

$$z = \left(\frac{CAR - \mu}{\sqrt{var(CAR)}}\right) \quad (8)$$

Under the null hypothesis μ = 0, and thus is omitted from the formula.

H_0 is rejected at significance level of 95% when z-value is ± 1.96, and H_0 is rejected at significance level of 99% when z-value is ± 2.57.

5.2 Methods for testing long-run abnormal returns

5.2.1 Challenges of long-term tests

All event studies must tackle the following issues: Risk adjustment and abnormal return modeling, the aggregation of security-specific abnormal returns, and the calibration of statistical significance of abnormal returns. However, the significance of these issues amplifies with long horizons. For example, a small error in risk adjustment can make a huge difference in the estimated abnormal returns over horizons over one year. On the contrary, for short-term, misestimating the portfolio's beta can cause only relatively small errors in calculating abnormal returns. Modeling expected returns is always challenging and to quote Fama (1998): "All models for expected returns are incomplete descriptions of the systematic patterns in average returns. The purpose of the event study is specifically to isolate the effects of the event from the other determinants of the stock performance. (Kothari et al. 2006)

In comparison to short-term returns, testing long-run abnormal stock returns is far more complicated. Traditional methods often yield misspecified test statistics because of five main causes: (1) the new listing or survivor bias, (2) the rebalancing bias, (3) the skewness bias, (4) cross-sectional dependence, and/or (5) a bad model for asset pricing. If and how the aforementioned factors induce misspecification depends on the method used to determine abnormal returns. Usually, survivor bias leads to positive bias in the test statistic, and the rebalancing and skewness biases create a negative bias. The source of the survivor bias is that in long-run event studies the sampled firms are tracked for a post-event period, whereas firms that make up the reference portfolio begin trading following to the event month. It is common to assume periodical rebalancing in calculating the compound returns of the reference portfolio, while the returns of the sample firms are compounded without rebalancing. This leads to the rebalancing bias. (Lyon et al. 1999)

In the long-term, the skewness bias is problematic especially for buy-and-hold returns as the lower bound is -100% and there is no upper bound for returns, which will lead to right-skewed distribution of abnormal returns. Specification bias arises from the cross-correlation in returns is also a serious problem in measuring long-term abnormal returns. Long-term abnormal returns tend to be cross-correlated for the following three reasons: (1) due to the long measurement period, abnormal returns of subsamples are likely to share a common event period; (2) events don't distribute evenly over time but tend to exhibit waves (especially corporate events like M&A); (3) some industries might be over-represented in the sample. (Kothari et al. 2006)

John DF. Lyon, Brad M. Barber, and Chih-Ling Tsai studied improved methods for tests of long-run abnormal stock returns (1999). They focused on the two main methods for assessing post-event risk-adjusted performance: Buy-and-hold abnormal returns (BHAR) and the calendar-time portfolio approach also known as Jensen's alpha approach. Both methods aim to tackle the factors causing misspecification. BHAR approach answers the question whether the sample portfolios earned abnormal returns over the time horizon under analysis, and thus buy-and-hold returns resemble the investors' actual experience. Alternatively, the calendar-time portfolio approach denotes whether the sample portfolios persistently earn abnormal monthly returns. The two methods have their advantages and disadvantages (discussed below), and for the sake of thoroughness and more profound analysis, both are used in this study.

5.2.2 The buy-and-hold approach

The buy-and-hold approach uses a traditional event study frameworks and buy-and-hold abnormal returns calculated using reference portfolios. The reference portfolio consists of the matched sample. It is constructed so that the population mean abnormal return for the reference portfolio is zero. The use of sample portfolios and reference portfolios alleviates the survivor bias since the companies in the portfolios remain the same, the rebalancing bias as there is no rebalancing since the reference is a portfolio (of fixed matched firms) instead of an index, and finally, the problem of cross-correlation because the events are independent, rarely overlap, and are drawn from multiple different industries. The skewness problem would be eliminated by the use of matched sample since the sample and control firms are equally likely to experience large positive returns. However, in the case of buy-and-hold returns, the skewness bias is likely to remain (Lyon et al. 1999). This is taken into account by the use of a skewness-adjusted *t*-statistic. For the sake of more throughout analysis, I estimated the buy-and-hold abnormal returns (BHAR) also with the sector indices. Even though the use of indices in long-term event studies is problematic (the new listing or survivor bias, the rebalancing bias), the construction of the matched sample is somewhat subjective despite of the strict criteria and poses some challenges as well. I believe that a comparative analysis between the results will lead to a more accurate conclusion.

5.2.2.1 Calculation of abnormal returns

From the daily returns I calculated the long-horizon returns for 12-, 24-, and 36-month holding periods by first calculating the mean monthly returns for each 120 companies, their matched pairs, and matched sector indices, and then compounding the mean returns over the holding period. In order to calculate the monthly returns I converted the simple returns to logarithmic returns that are

time additive (see equation 4 in section 4.2). Once the monthly logarithmic returns were computed, I converted them back to simple returns (see equation 3 in section 4.2) in order to compound the mean monthly returns over the holding period. As the conventional number of trading days in a year is 250, I defined trading days per month as 21 days. I used the following equation to define the portfolio long-horizon returns:

$$R_{psT} = \prod_{t=s}^{s+T}\left(1 + \left(\frac{(\sum_{i=1}^{n_t} R_{it})}{n_t}\right)\right) - 1 \quad (9)$$

In equation (9) *s* is the beginning of the period, T is the period of investment in months (12, 24, 36), R_{it} is the return on security *i* in month *t*, and *n* is the number of securities in month *t*.

Next I calculated the long-run buy-and-hold abnormal returns denoted as:

$$AR_{it} = R_{it} - E(R_{it}) \quad (10)$$

In (10) AR_{it} is the T period buy-and-hold abnormal return for company *i*, R_{it} is the period T buy-and-hold return on the company *i*, $E(R_{it})$ is the period T expected return for company *i*, which is estimated by using the returns of the matched firm. As mentioned above, in addition to the matched firm, I also used MSCI Sector Indices matched for each sample firm to estimate the period T expected return. The returns for the matched stock and indices were collected from the same time period (the event period) as for the sample company.

5.2.2.2 Statistical tests

To test the significance of different sample portfolio buy-and-hold abnormal returns, I used the company specific BHAR's to calculate the t-values for the six portfolios for the three holding periods. A conventional t-statistic is often used to test a null hypothesis that abnormal returns for the sample portfolio equals zero.

$$t = \frac{\overline{AR_T}}{\frac{\sigma(AR_T)}{\sqrt{n}}} \quad (11)$$

where $\overline{AR_T}$ is the sample mean and $\sigma(AR_T)$ is the cross-sectional sample standard deviation of abnormal returns for the sample portfolio of n firms.

However, because long-run buy-and-hold returns are positively skewed, the t-statistic tends to be negatively biased. In order to eliminate this bias, Lyon, Barber, and Tsai (1999) recommend using a skewness-adjusted t-statistic:

$$t_{sa} = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma}\right) \quad (12)$$

where

$$S = \frac{\overline{AR}}{\sigma(AR_T)} \qquad \text{and} \qquad \hat{\gamma} = \frac{\sum_{i=1}^{n}(AR_{it} - \overline{AR}_{it})^3}{n\sigma(AR_T)^3}$$

In equation (12) $\sqrt{n}$S is the conventional t-statistic and $\hat{\gamma}$ is the estimate of the coefficient of skewness. This modified test statistic is based on Edgeworth Expansion and was developed by Johnson in 1978. It has been studied also by Hall (1992) and Sutton (1993). (Lyon et al. 1999)

I calculated the skewness-adjusted t-values for each six samples and for both versions of BHAR approach (matched firm return vs. index return as the expected return) and used the results to evaluate the statistical significance of buy-and-hold abnormal returns (see section 6.2 for results).

5.2.3 The calendar-time portfolio method

The calendar-time portfolio approach is based on calculation of mean monthly abnormal returns using calendar-time portfolios and a time-series t-statistic. It was first introduced by Jaffe (1974) and Mandelker (1974) and has been since supported by many finance researchers including Fama (1998) and Mitchell and Stafford (2000). The calendar-time portfolio method has the following advantages it possesses over the BHAR approach. First, the method eliminates the problem of cross-sectional dependence among sample firms since the returns of the sample firms are aggregated into a single portfolio. However, in this study this is trivial since I have used a matched control sample also in the buy-and-hold approach. Secondly, the calendar-time portfolio method yields more robust test statistic in nonrandom samples. Finally, mean monthly abnormal returns are less skewed than buy-and-hold returns and thus less problematic statistically. Cumulative abnormal returns are less skewed than buy-and-hold abnormal returns, and thus even the conventional t-statistics yield well specified test statistics. The calendar-time portfolio method is also immune to the specification bias arising from cross-correlated abnormal returns because of the use of calendar-time portfolios. (Lyon et al. 1999)

There are two variations of calendar-time portfolio methods: One based on the Fama-French three factor model and one based on the use of mean monthly calendar-time abnormal returns. Lyon, Barber and Tsai argue that the calendar-time portfolio method based on reference portfolio abnormal returns dominate over the method of using Fama-French three factor model. Their rationale is based on the limitations of the Fama-French approach: It assumes linearity in the constructed market, size, and market-to-book factors, and it also assumes no interaction between the

three factors. Therefore, I decided to use the reference portfolio abnormal returns, both matched firm portfolios and sector index portfolios, utilized already in the BHAR approach in this calendar-time portfolio approach as well. A reference portfolio will therefore consist of the matched pairs for each sample company, either the appropriate sector index or matched firm. (Lyon et al. 1999)

5.2.3.1 Mean monthly calendar-time abnormal returns

I computed the daily returns for the different sample portfolios and their corresponding reference portfolios of matched firms and the portfolios of matched MSCI indices for the holding period (event day + 12/24/36 months) by calculating the averages of the daily simple returns. Again, I had to convert the returns back to logarithmic returns in order to calculate the monthly returns for each six portfolios. Next, the mean monthly logarithmic returns for each six portfolios and for each month 1-36 of the holding period were calculated.

I defined the abnormal returns by comparing the daily portfolio returns to those of the two reference portfolios, of matched firms and of matched sector indices.

$$AR_{it} = R_{it} - R_{pt} \tag{13}$$

where AR_{it} is the daily abnormal return on the portfolio *i*, R_{it} is the daily return on portfolio, and R_{pt} is the daily return on the reference portfolio. The mean abnormal monthly return is defined as:

$$MAR_t = \sum_{t=1}^{n_t} AR_{it} \tag{14}$$

where *n* is the number of days in month *t*. I weighted abnormal returns equally. Since I started off with monthly return data, I was able to compute the MARs by applying equation (13) directly to the monthly returns.

Finally, I calculated the grand mean monthly abnormal returns (MMAR):

$$MMAR = \frac{1}{T}\sum_{t=1}^{T} MAR_t \tag{15}$$

where *t* denotes the month, and *T* the total number of months (12, 24, 36).

5.2.3.2 Statistical tests

To test the null hypothesis of zero mean monthly return; I calculated the t-statistic using the time series standard deviation of the mean monthly abnormal returns:

$$t(MMAR) = \frac{MMAR}{\frac{\sigma(MAR_t)}{\sqrt{T}}} \quad (16)$$

Similar to the procedure in the BHAR approach, I calculated the t values for each 12-, 24-, and 36-month periods to form a better understanding of the long-term effect of the ESG events.

5.3 Limitations and critique of methodology

Heteroscedasticity may bias the results in the event study. When using the ordinary least squares technique, one of the assumptions is that the error term has a constant variance. However, with time series data, the error terms often have different variables. Heteroscedasticity can lead to underestimation of the variance of the coefficients and, thus, standard errors. With heteroscedastic data, the OLS estimator is unbiased and consistent but it is not the Best Linear Unbiased Estimator (BLUE) of the Gauss-Markov theorem (Dougherty, 2007). It nevertheless describes the relationship between the variables well, but cannot reliably estimate the statistical significance of the relationship. The use of the log of the data lessens heteroscedasticity. The White's test is used to detect heteroscedasticity (see section 7 for robustness checks).

In the event study analysis, it is assumed that the error terms are uncorrelated. However, this is often inappropriate assumption for time series data. Autocorrelation refers to the correlation of a time series with its own past and future values. This would imply that a time series is predictable. The problem of autocorrelation arises, when the disturbance terms are autocorrelated. Standard regression model includes the assumption of independent disturbance terms between observations. This might lead to biased results. Positive autocorrelation, for example, would lead to underestimation of the standard errors and the t-values will be biased upwards. The variance of the error term would also be underestimated so that R squared will be exaggerated. The Durbin-Watson statistic will be constructed to test for autocorrelation (see section 7 for robustness checks).

With BHAR-approach, the especially problem skewness can bias the results. As Barber and Lyon (1997a) stated, long-horizon buy-and-hold abnormal returns are positively skewed and this positive skewness leads to negatively biased t-statistics. The use of the matched control firm portfolio and skewness-adjusted t-test conducted in this study reduces the bias, but the test statistic might still not be well-specified.

Even though the calendar time portfolio approach has many advocates, it has also been criticized. For instance, Loughran and Ritter (2000) argue that it might be biased toward finding results consistent with market efficiency (Kothari and Warner, 2006). They explain their view by stating

that managements time the events to exploit mispricing, but the calendar time portfolio approach under-weights manager's timing decisions and over-weights other observations by forming calendar-time portfolios. However, this is unlikely to cause a significant error in this study, as the managements' abilities to control press releases are limited.

Relating to the calendar-time portfolio approach, there is a problem with variance shifts: Events are generally likely to be connected with variance increases, in other words, the abnormal returns varying across sample stocks. Variance shifts can lead to misspecification that in turn can cause the null hypothesis to be rejected too often. Therefore, it is difficult to reliably determine whether high abnormal returns are the result of chance, mispricing or a bad model (Kothari and Warner, 2006). Another shortcoming of the calendar time portfolio model is that relative to earlier research, the power of the tests is still low (Jegadeesh and Karceski, 2004).

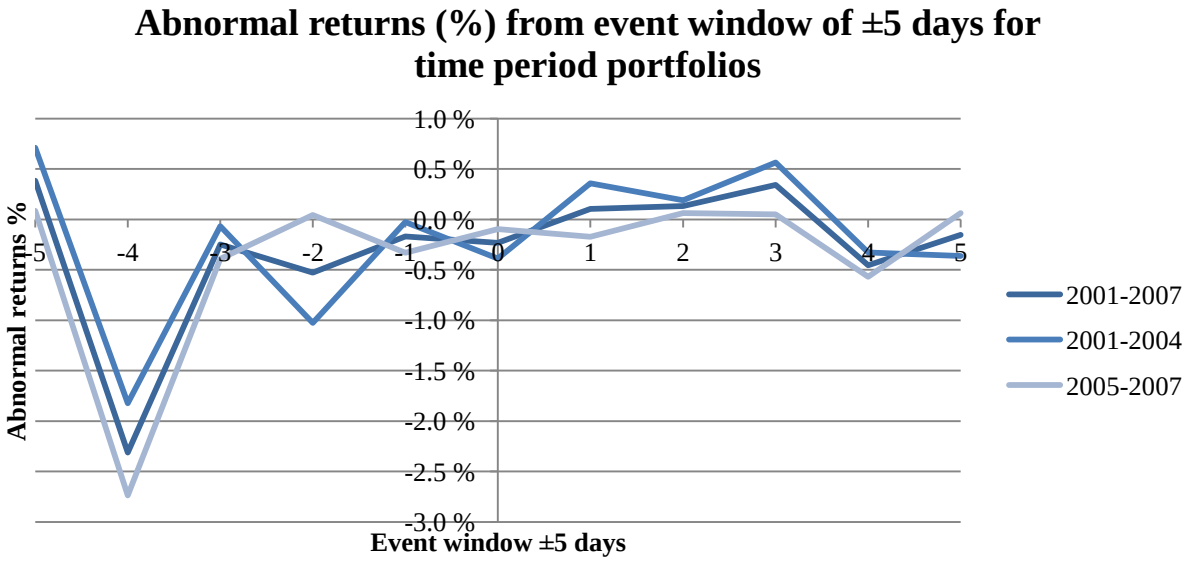
6. Empirical results

In this chapter, I will report the empirical results from the short- and long-term statistical analysis of the event data. Further analysis and implications of the results will be presented and in chapter 8.

6.1 Short-term

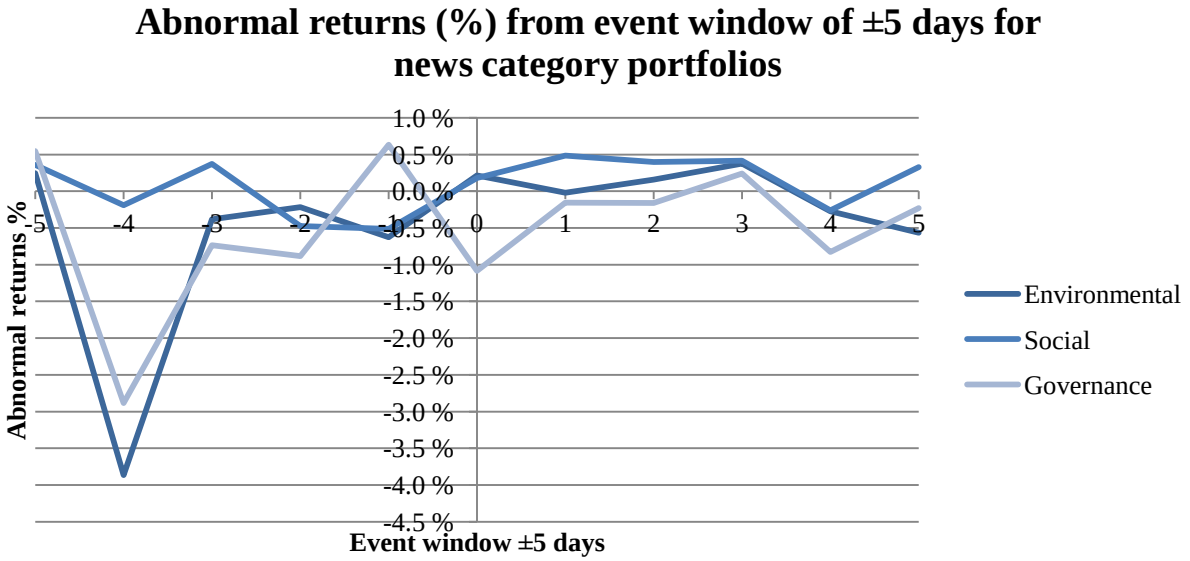
6.1.1 Short-term event study results

Figure 7: Abnormal returns from the ±5 day event window for time period portfolios



Note: Day 0 denotes the day of the publication of the news.

Figure 8: Abnormal returns from the 11-day event window for news category portfolios



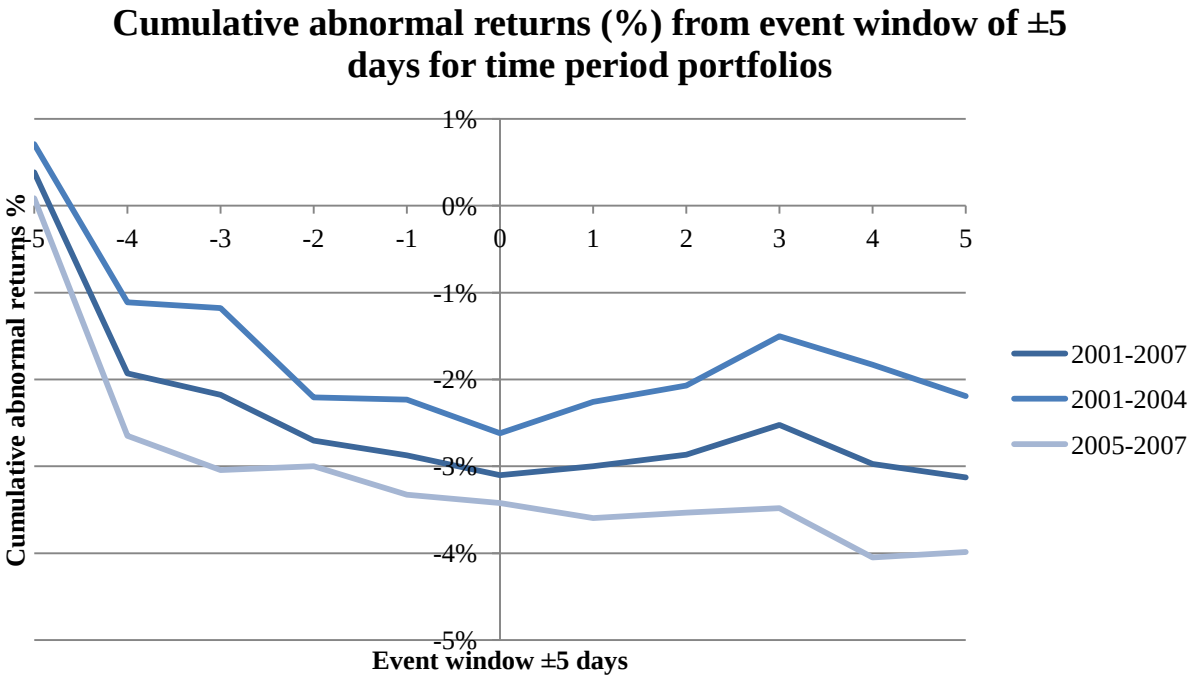
Note: Day 0 denotes the day of the publication of the news.

Figures 7 and 8 depict the daily abnormal returns over the ±5-days event window on the six sample and subsample portfolios estimated by the OLS regression using the market model. Interestingly, it can be observed that the initial market reaction takes place on the day -4, that is to say, four days preceding the publication of the news article. Despite the fact that these portfolios compose of various different cases (ESG news) concerning different companies and different time periods, the day of the initial market reaction is same for all portfolios. This suggests that the information about the event has spread out through different, faster channels of media than print media, most likely the Internet and very up-to-date professional investor sources as Reuters. It is also apparent that on average, the reaction has been dramatically and consistently (across sample portfolios) negative on the day -4, but has quickly bounced back, however to a lower than initial level of returns. The quick recovery on day -3 could suggest an increased demand for the stock, which is likely to be underpriced as a result of the plunge on day -4. Increased demand would then push up the prices. Studying the figures 6 and 7, it would also seem that during the days following the event (day 0), there is clear volatility in abnormal returns signaling of the uncertainty and speculation in the market that the event has caused.

Comparing the initial (day -4) market reaction across the different categories of ESG news, news about environmental violations has had the most dramatic negative effect on returns (-3.864%), whereas news about social misbehavior has had the least impact on returns (-0.19%). Overall, the initial market reaction (on day -4) for the total sample is -2.313%. After the recovery on day -3 until day +3, the behavior of abnormal returns would seem quite random, but again on the day +4, all portfolios faced a drop in returns. This could mean that more information has been published about the incident and the likely implications to the firm and/or its shareholders have become clearer. It can also be concluded from the abnormal returns for portfolios 2001-2004 and 2005-2007, that investors' short-term reaction to ESG news has become more dramatic over the years.

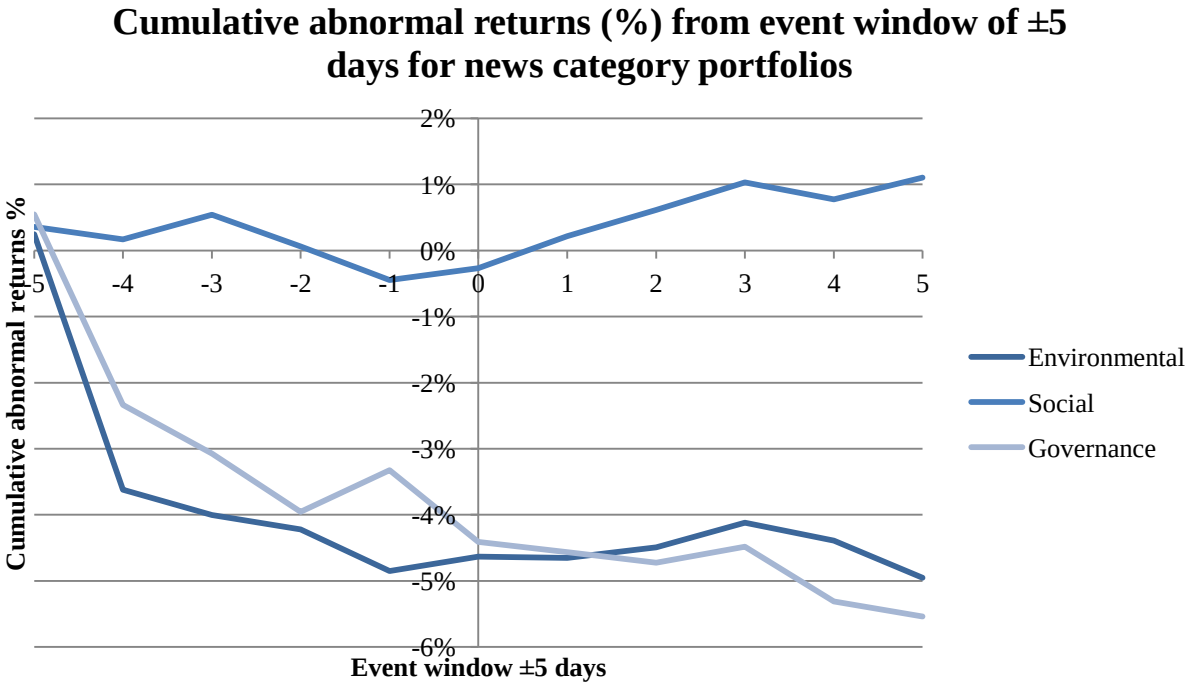
Only for samples "governance" and "2001-2004" is there a visible drop in abnormal returns on the day zero, which is the day of the publication of the article. For portfolio 2001-2004 this was to be expected as the role of paper media was still more significant in the beginning of the 21st century compared to the second half of the decade, due to the rapid development of information technology.

Figure 9: Cumulative abnormal returns from the ±5 day event window for time period portfolios



Note: Day 0 denotes the day of the publication of the news.

Figure 10: Cumulative abnormal returns from the ±5 day event window for news category portfolios



Note: Day 0 denotes the day of the publication of the news.

Figures 9 and 10 depict the cumulative abnormal returns from the 11-day event window on the six sample and subsample portfolios. The figures illustrate the investors' experience if s/he holds the portfolio over the event window. For the total sample the cumulative abnormal return over the event window is -3.129%. Similar to figures 7 and 8 of abnormal returns, it is obvious from these graphs that the market reaction to negative environmental news is the most significant and least significant for news from the social category. Cumulative abnormal returns turn positive during the event window only for social news (1.102%) and stay negative for all other portfolios. It is also clear from figure 9 that the cumulative abnormal returns induced by ESG news have become notably more negative during recent years than in the beginning of the decade.

Table 7 (on the next page) summarizes the day-specific abnormal and cumulative abnormal returns for the ±5-day event window for all six portfolios estimated by the short-term OLS regression analysis with the market model. The same information was illustrated by figures 7-10.

Table 7: Cumulative abnormal returns on the six portfolios for the ±5 day event period

The table depicts the abnormal (AR) and cumulative abnormal returns (CAR) over the event period on all six portfolios (that illustrate the average subsample returns) defined by the short term OLS regression. Day 0 denotes the day the news article was published.

AR and CAR on portfolios over event period

	2001-2007		2001-2004		2005-2007		Environmental		Social		Governance	
Event day	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR
-5	0.384 %	0.384 %	0.710 %	0.710 %	0.085 %	0.085 %	0.244 %	0.244 %	0.359 %	0.359 %	0.547 %	0.547 %
-4	-2.313 %	-1.929 %	-1.821 %	-1.111 %	-2.736 %	-2.651 %	-3.864 %	-3.620 %	-0.190 %	0.170 %	-2.885 %	-2.337 %
-3	-0.249 %	-2.178 %	-0.067 %	-1.178 %	-0.392 %	-3.043 %	-0.383 %	-4.003 %	0.370 %	0.540 %	-0.734 %	-3.071 %
-2	-0.526 %	-2.704 %	-1.027 %	-2.205 %	0.044 %	-2.999 %	-0.218 %	-4.221 %	-0.476 %	0.064 %	-0.884 %	-3.956 %
-1	-0.169 %	-2.873 %	-0.027 %	-2.232 %	-0.329 %	-3.329 %	-0.628 %	-4.849 %	-0.512 %	-0.448 %	0.632 %	-3.323 %
0	-0.230 %	-3.104 %	-0.388 %	-2.619 %	-0.096 %	-3.425 %	0.214 %	-4.634 %	0.180 %	-0.268 %	-1.085 %	-4.408 %
1	0.103 %	-3.000 %	0.360 %	-2.260 %	-0.172 %	-3.597 %	-0.018 %	-4.652 %	0.484 %	0.216 %	-0.156 %	-4.565 %
2	0.133 %	-2.867 %	0.191 %	-2.069 %	0.064 %	-3.532 %	0.159 %	-4.493 %	0.398 %	0.615 %	-0.158 %	-4.723 %
3	0.344 %	-2.523 %	0.567 %	-1.502 %	0.052 %	-3.480 %	0.375 %	-4.118 %	0.416 %	1.031 %	0.242 %	-4.480 %
4	-0.453 %	-2.975 %	-0.328 %	-1.830 %	-0.569 %	-4.050 %	-0.271 %	-4.389 %	-0.258 %	0.773 %	-0.829 %	-5.309 %
5	-0.154 %	-3.129 %	-0.362 %	-2.193 %	0.062 %	-3.987 %	-0.563 %	-4.952 %	0.329 %	1.102 %	-0.227 %	-5.536 %

Notes: The abnormal returns have been defined by using the market model OLS regression with 120-day estimation period.

Table 8: Statistical analysis of short term abnormal returns

The table depicts the cumulative abnormal returns over the 11-day event period and their corresponding variances, standard deviations and z-values as well as the statistical significances of z-values.

Statistical analysis of abnormal returns

Portfolio	CAR	VAR(CAR)	StDev(CAR)	Z-value	Significance
2001-2007	-3.13 %	0.0001	0.010	-3.089	***
2001-2004	-2.19 %	0.0001	0.009	-2.371	***
2005-2007	-3.99 %	0.0001	0.011	-3.526	***
Environmental	-4.95 %	0.0002	0.015	-3.413	***
Social	1.10 %	0.0000	0.005	2.223	**
Governance	-5.54 %	0.0003	0.017	-3.232	***

Notes: The rejection of the H_0: abnormal returns = 0 at 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Estimation window of 120 days was used to estimate the market model.

Table 8 represent the results of the statistical analysis of the cumulative abnormal returns estimated using the OLS regression with the market model. For all portfolios, the null hypothesis of abnormal returns being zero is *rejected*. This result implies that there is a significant market reaction to negative ESG news that affects the returns for at least until five days have passed since the event. For all portfolios but social news, the 11-day cumulative abnormal return was negative and statistically significant at level 99%. Interestingly enough, for the social portfolio, the cumulative abnormal returns were positive and statistically significant at 95% level. This suggests that the stock price of companies that have experienced negative social issue-related publicity recover the quickest after the initial plunge.

When comparing 11-day CARs for the two consecutive time period samples 2001-2004 and 2005-2007, it can be observed that the short-term cumulative abnormal returns induced by the ESG news have become more negative and more statistically significant over the years.

The short term CARs are the lowest (-5.54%) for corporate governance news sample of the three categories. The CAR for the environmental sample is the second lowest with -4.95%, while the CAR for social sample is +1.1%. This result could be related to the direct costs likely to be induced

by white-collar crimes and environmental accidents, as well as to cost savings often related to social incidents such as layoffs due to process restructuring.

6.1.2 Top and bottom 5cases

The news cases which induced the five highest and lowest cumulative abnormal returns over event period of ±5 days are listed in tables 9 and 10 below.

Table 9: Top 5 ESG-news cases ranked by the highest cumulative abnormal returns

Top 5	Company	News date	News headline	Category	Event period CAR
1	Capgemini	13.10.2001	Cap Gemini plans to cut 600 more jobs	Social	+31.02 %
2	Groupe Partouche	31.12.2004	Casino staff (of 17 000) threaten strike	Social	+9.32 %
3	Adecco	20.1.2004	Swiss watchdog opens probe into insider trading at Adecco	Governance	+9.19 %
4	British Midland Airways Ltd	13.6.2003	BMI to cut 1,200 jobs and bring its baby south	Social	+8.37 %
5	Banco Bilbao Vizcaya Argentaria	17.7.2002	US probes alleged money laundering by BBVA	Governance	+7.96 %
(6	Prudential PLC	3.11.2001	Prudential to axe 2,100 jobs	Social	+7.89 %**)**

Table 10: Bottom 5 ESG-news cases ranked by the lowest cumulative abnormal returns

Bottom 5	Company	News date	News headline	Category	Event period CAR
1	Koninklijke Ahold Nv (Royal Ahold)	28.2.2003	Group's former chief accused of embezzlement	Governance	-65.63 %
2	Xerox Corp	12.4.2002	Xerox 'used accounting tricks'	Governance	-16.08 %
3	TJ Group Plc.	27.1.2005	Finnish State Prosecutor raises charges against TJ Group	Governance	-14.77 %
4	AstraZeneca	21.6.2003	Drug maker pays Dollars 355m in fraud probe	Governance	-12.65 %
5	Morgan Crucible Co Plc.	17.10.2006	Former chief executive appeals against US extradition	Governance	-11.90 %

(6	BP Plc.	24.8.2002	Authorities in Alaska probe BP site blast	Environmental	-10.34 %**)**

As stated, the aim of this study was to analyze the general market sentiment toward negative ESG-news instead of studying the individual cases. At a specific company level there are various factors and events going on at all times that are likely to affect the share prices to some extent. However, when these cases are analyzed as a large group, individual noise will moderate. Thus, the lists of cases that have induced the highest and lowest cumulative abnormal returns, presented on the previous page, are simply intended to give an idea of the types of cases used in the sample.

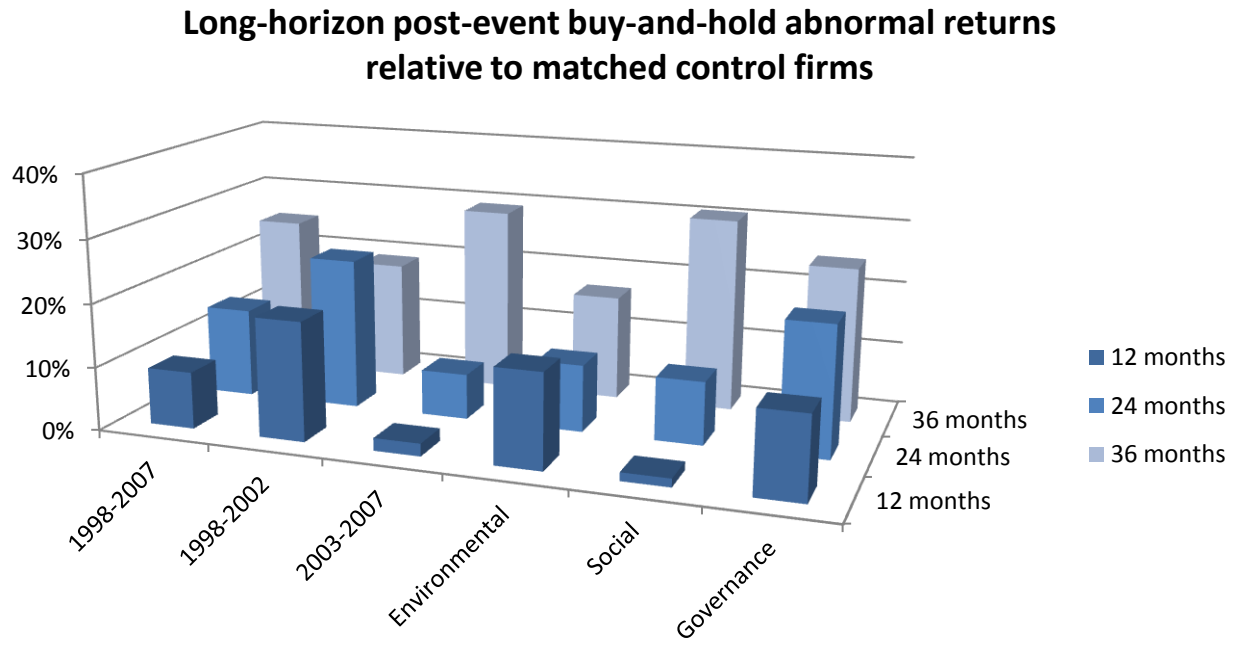
Consistent with the short-term results on the sample portfolios, the most negative impact has been induced by news related to corporate governance and the most positive impact was caused by social news.

Even though most radical cases were intended to be screened out from the sample, it can be observed that the number one top and bottom cases represent unusually strong abnormal returns. In order to test their impact on the total results, calculations were made also without the number 1 top and bottom cases (Capgemini and Royal Ahold). This, however, did not alter the results significantly (short-term effect still significantly negative). As explained earlier, no adjustments for irrelevant events have been made to the statistical analysis and the models used in this study and thus the adequacy of the data relies on the initial screening process. The decision to do so relies on the findings of Thompson (1988) that the impact of irrelevant events in the study is marginal.

6.2 Long-term

6.2.1 Results from the Buy-and-Hold approach

Figure 11: Long-horizon (12, 24, 36 months) BHARs relative to matched firms



See table 11 for more specific information.

BHAR approach was taken to evaluate whether the sample portfolios earned abnormal returns over the post-event time horizons under analysis, and to measure the investors' actual experience. Figure 11 illustrates the long-horizon buy-and hold returns after the event on the six different portfolios for three different holding periods (12, 24, 36 months). The abnormal returns have been calculated using the matched control samples as the reference portfolios.

All buy-and-hold abnormal returns (BHAR) have been positive which indicates that the stock performance has recovered from the initial plunge after the event. This could be interpreted as the market not punishing the companies for unethical actions in the long-run. On the contrary, it would seem that positive abnormal returns as high as approximately 30% are available for long-term investors.

However, based on the buy-and-hold returns, the exploitable buy-and-hold abnormal returns after an ESG event have changed over the years (1998-2002 vs. 2003-2007). The BHARs for 12- and 24-months have become significantly smaller more recently. On the contrary, the 36-month returns

have become larger. Nevertheless, it should be kept in mind that with event studies, the more time passes after the event, the more difficult it is to allocate changes in returns to the event due to the increasing noise. Therefore, one should be prudent in drawing conclusion from 36-month BHARs.

Overall, the BHARs increase as the holding period becomes longer, but this is not consistently the case when analyzing subsample portfolio returns separately. It is also visible from the figure 11 that the 36-month BHAR is the highest for social news portfolio (30.62%) and lowest for environmental news portfolio (16.64%).

Table 11: Specification of buy-and-hold abnormal returns measured with the matched portfolio

This table summarizes the results from the buy-and-hold approach to estimating long horizon (12, 24, and 36 months) buy-and hold abnormal returns using the matched firm control sample.

Specification of buy-and-hold abnormal returns measured with the matched firms

	1998-2007	1998-2002	2003-2007	Environmental	Social	Governance
			12 months			
Average	8.97 %	18.74 %	1.99 %	14.90 %	1.33 %	12.96 %
StDev	0.407	0.414	0.389	0.394	0.285	0.505
t_{sa} value	2.426	3.908	0.397	2.265	0.288	1.721
Significance	**	***	-	**	-	-
			24 months			
Average	14.10 %	23.80 %	7.16 %	10.58 %	9.96 %	20.59 %
StDev	0.628	0.564	0.665	0.640	0.454	0.767
t_{sa} value	2.534	3.459	0.903	0.916	1.393	1.909
Significance	**	***	-	-	-	*
			36 months			
Average	24.94 %	18.92 %	29.24 %	16.64 %	30.62 %	24.48 %
StDev	1.022	0.934	1.085	1.172	0.864	1.086
t_{sa} value	2.695	1.307	2.448	0.693	2.574	1.621
Significance	***	-	**	-	**	-

Notes: 2-tailed t-test: the rejection of the H_0: abnormal returns = 0 at 90% level is denoted as *, 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Acceptance of H_0 is denoted as - . t_{sa} refers to skewness adjusted t value. One month is assumed to equal 21 working days.

Table 11 depicts the results of the statistical analysis of the long-horizon buy-and-hold abnormal returns defined by the reference portfolios of matched control sample. For all samples, the 12-, 24-, 36-month BHARs have been positive, which is interesting considering the significantly negative cumulative abnormal returns of the short-term event window. For the total 10-year sample all BHARs are significantly positive (8.97%, 14.1%, 24.94%), but the statistical significance of results for the subsamples varies.

It was observable already form Figure 10 that the 36-month BHAR was highest for social and lowest for environmental news samples. Furthermore, as t-values in table 11 suggest, the most significant buy-and-hold abnormal returns for environmental sample are gained when the portfolio is held for 12-months only, while for the social portfolio the largest abnormal returns are obtained by holding the portfolio for 36 months.

Similarly, for the portfolio 1998-2002, holding the portfolio just for 12-months was enough to earn significant buy-and-hold abnormal returns. On the contrary, for sample 2003-2007, investors would need to hold the portfolio for 36-months before earning significant BHARs.

6.2.2 The results from the Calendar-Time Portfolio approach

Figure 12: Mean Monthly Abnormal Returns on time period portfolios relative to the matched firm portfolios using the calendar-time approach

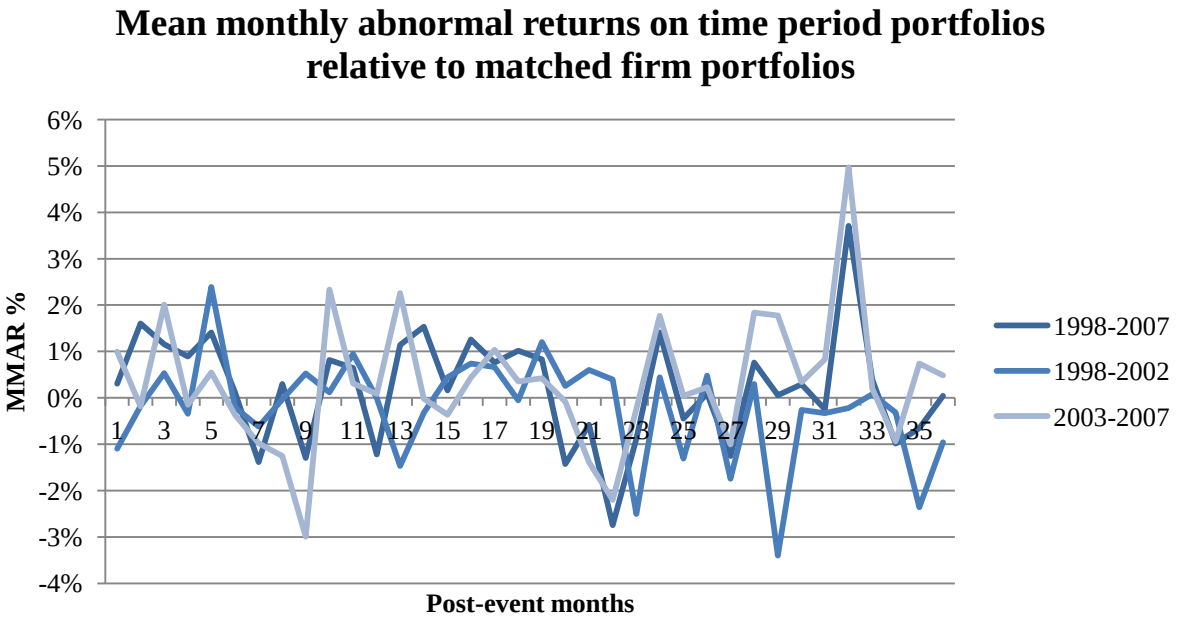
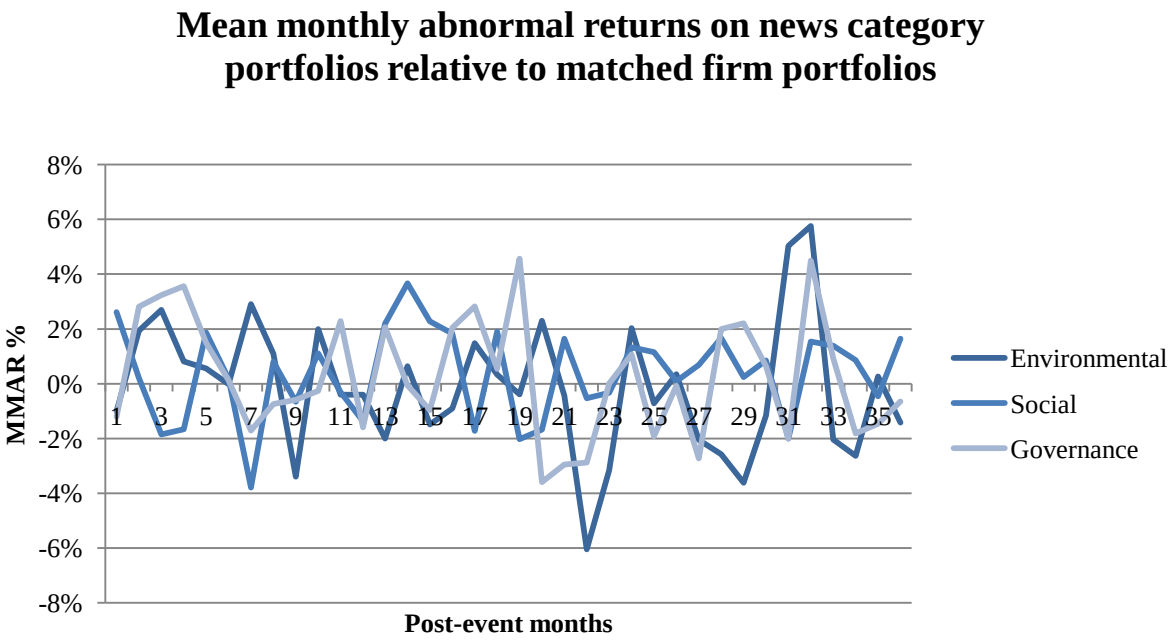


Figure 13: Mean Monthly Abnormal Returns on news category portfolios relative to the matched firm portfolios using the calendar-time approach



The calendar-time portfolio approach to analyzing long-term abnormal results was taken to study whether the sample portfolios persistently earn abnormal monthly returns after an ESG event. Figures 12 and 13 plot the Mean Monthly Abnormal Returns (MAR) relative to the matched portfolios using the calendar-time approach for each of the 36 months and for each portfolio. The mean abnormal return has been calculated for each month as the mean monthly return of the companies included in the sample in question for the n^{th} month after the event. Thus, the returns illustrated in the graphs are not cumulative.

Despite of a few peaks, the mean monthly abnormal returns range between ±4% in a random zigzag-manner. There are two visible peaks for the MAR of environmental portfolio in Figure 12: In month 22 (~ -6%) and in month 32 and 33 (~ +6%). MAR of the governance portfolio peaks at ~ +4.5% in month 29. Nevertheless, the peaks are not alarmingly high and no clear patterns in behavior of mean monthly abnormal returns are observable from the figures.

Mean monthly abnormal returns were clearly present in every 36 months after the ESG news publication. Analysis of the significance of the grand mean monthly return for the three different length periods (12, 24, 36 months) was conducted in the form of t tests and the results are reported in Table 10 (next page).

Table 12: Specification of Monthly Calendar-Time Portfolio Abnormal Returns relative to the matched portfolio

The analysis in this table is based on the results from the calendar-time portfolio approach to estimating long horizon (12, 24, and 36 months) abnormal returns using reference portfolios compiled of the matched control sample.

Specification of Monthly Calendar-Time Portfolio Abnormal Returns relative to the matched portfolio

	1998-2007	1998-2002	2003-2007	Environmental	Social	Governance
12 months						
MMAR	0.28 %	0.17 %	0.03 %	0.56 %	-0.24 %	0.62 %
var	0.000	0.000	0.000	0.000	0.000	0.000
StDev	0.011	0.009	0.014	0.018	0.018	0.019
t value	0.915	0.659	0.068	1.101	-0.466	1.101
Significance	-	-	-	-	-	-
24 months						
MMAR	0.24 %	0.10 %	0.10 %	-0.04 %	0.24 %	0.42 %
var	0.000	0.000	0.000	0.000	0.000	0.000
StDev	0.012	0.009	0.013	0.021	0.019	0.022
t value	1.004	0.520	0.361	-0.083	0.627	0.937
Significance	-	-	-	-	-	-
36 months						
MMAR	0.21 %	-0.21 %	0.33 %	-0.16 %	0.37 %	0.27 %
var	0.000	0.000	0.000	0.001	0.000	0.000
StDev	0.012	0.011	0.014	0.024	0.016	0.022
t value	1.057	-1.153	1.390	-0.395	1.368	0.747
Significance	-	-	-	-	-	-

Notes: 2-tailed t-test: the rejection of the H_0: abnormal returns = 0 at 90% level is denoted as *, 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Acceptance of the H_0 is denoted as - . One month is assumed to equal 21 working days.

Based on the t tests conducted on the mean monthly abnormal returns calculated using the monthly calendar-time portfolio approach and the matched sample as the reference portfolio, the sample portfolios *do not* persistently earn post-event abnormal monthly returns. As can be seen from the table 12, all t-values are insignificant.

For the 12-month holding period, all abnormal returns were, on average, positive, for all samples but social. The mean monthly abnormal return from 12 month period for social sample portfolio was -0.24%, but turns positive when estimated from the longer period of 24 or 36 months. Conversely, for the environmental news sample portfolio, the mean monthly abnormal return turns negative when estimated for 24- and 36-month periods.

7. Robustness checks

7.1 Short-term study with longer estimation window

In order to test the influence of estimation window length to the results, the short-term regression analysis was conducted also by using an estimation window of 200 days instead of 120 days in estimating the market model. The daily abnormal returns (AR) and cumulative abnormal returns (CAR) are reported in Table 14 on the next page. Table 13 below depicts the portfolio specific cumulative abnormal returns and their statistical analysis.

Table 13: Statistical analysis of short term abnormal returns (estimation window of 200 days)

The table depicts the cumulative abnormal returns over the 11-day event period and their corresponding variances, standard deviations and z-values as well as the statistical significances of z-values.

Statistical analysis of abnormal returns

Portfolio	CAR	VAR(CAR)	StDev(CAR)	Z-value	Significance
2001-2007	-2.95 %	0.0001	0.010	-3.029	***
2001-2004	-1.87 %	0.0001	0.009	-2.116	**
2005-2007	-4.00 %	0.0001	0.011	-3.574	***
Environmental	-4.28 %	0.0002	0.014	-3.042	***
Social	0.66 %	0.0000	0.004	1.480	-
Governance	-5.24 %	0.0003	0.017	-3.176	***

Notes: The rejection of the H_0: abnormal returns = 0 at 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Estimation window of 200 days was used to estimate the market model.

In comparison, the results obtained by using a longer estimation window versus shorter window are very similar. The daily ARs and CARs are slightly lower with longer estimation window: For example for total sample CAR fell from -3.13% to -2.95%. However, the only notable difference is observable for the social-portfolio: CAR fell from +1.1% to +0.66% and went from statistically significant (95% level) to insignificant. Nonetheless, it can be concluded that the overall conclusions and implications are independent of the estimation window's length.

Table 14: Cumulative abnormal returns on the six portfolios for the ±5 day event period (estimation window of 200 days)

The table depicts the abnormal (AR) and cumulative abnormal returns (CAR) over the event period on all six portfolios (that illustrate the average subsample returns) defined by the short term OLS regression. Day 0 denotes the day the news article was published.

AR and CAR on portfolios over event period												
	2001-2007		2001-2004		2005-2007		Environmental		Social		Governance	
Event day	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR
-5	0.424 %	0.424 %	0.759 %	0.759 %	0.124 %	0.124 %	0.473 %	0.473 %	0.198 %	0.198 %	0.602 %	0.602 %
-4	-2.308 %	-1.883 %	-1.770 %	-1.010 %	-2.789 %	-2.665 %	-3.924 %	-3.451 %	-0.193 %	0.004 %	-2.806 %	-2.204 %
-3	-0.216 %	-2.100 %	-0.028 %	-1.038 %	-0.370 %	-3.035 %	-0.372 %	-3.822 %	0.374 %	0.378 %	-0.652 %	-2.856 %
-2	-0.465 %	-2.565 %	-0.975 %	-2.013 %	0.113 %	-2.922 %	-0.011 %	-3.833 %	-0.505 %	-0.127 %	-0.879 %	-3.735 %
-1	-0.116 %	-2.681 %	0.050 %	-1.963 %	-0.311 %	-3.233 %	-0.837 %	-4.670 %	-0.201 %	-0.327 %	0.689 %	-3.046 %
0	-0.293 %	-2.974 %	-0.493 %	-2.456 %	-0.110 %	-3.343 %	0.316 %	-4.354 %	-0.087 %	-0.414 %	-1.108 %	-4.154 %
1	0.162 %	-2.812 %	0.418 %	-2.038 %	-0.109 %	-3.453 %	0.204 %	-4.150 %	0.421 %	0.007 %	-0.139 %	-4.293 %
2	-0.031 %	-2.843 %	-0.080 %	-2.118 %	0.017 %	-3.436 %	-0.100 %	-4.250 %	0.218 %	0.225 %	-0.211 %	-4.503 %
3	0.490 %	-2.353 %	0.850 %	-1.268 %	0.029 %	-3.407 %	0.426 %	-3.823 %	0.733 %	0.957 %	0.310 %	-4.194 %
4	-0.419 %	-2.772 %	-0.281 %	-1.548 %	-0.553 %	-3.959 %	-0.209 %	-4.033 %	-0.168 %	0.790 %	-0.879 %	-5.072 %
5	-0.182 %	-2.954 %	-0.322 %	-1.871 %	-0.039 %	-3.998 %	-0.250 %	-4.283 %	-0.127 %	0.662 %	-0.169 %	-5.241 %

Notes: The abnormal returns have been defined by using the market model OLS regression with 200-day estimation period.

7.2 White-test for heteroscedasticity

Heteroscedasticity may bias the results in the event study. When using the ordinary least squares technique, one of the assumptions is that the error term has a constant variance. However, with time series data, the error terms often have different variables. Heteroscedasticity can lead to underestimation of the variance of the coefficients and, thus, standard errors. With heteroscedastic data, the OLS estimator is unbiased and consistent but it is not the best linear unbiased estimator (BLUE) of the Gauss-Markov theorem (Dougherty, 2007). It can still describe the relationship between the variables well, but cannot reliably estimate the statistical significance of the relationship. The use of the log of the data lessens heteroscedasticity. As a robustness check, the White's test is used to detect heteroscedasticity by calculating the White's Heteroscedasticity Consistent Standard Errors. (Ogunc and Hill, 2008)

$$\widehat{StDev}(b2) = \sqrt{([\sum((x_t - \bar{x})^2 \hat{e}_t^2)]/[(\sum(x_t - \bar{x}^2))^2]\,)} \qquad (17)$$

If the standard errors estimated by the OLS regression are different from the White's heteroscedasticity consistent standard errors, there is heteroscedasticity present and the t statistics and confidence interval are biased. The table below reports the standard errors for each regression of sample portfolios and the market index and the estimated White's standard errors.

Table 15: Standard errors for each regression of samples and the market index estimated by Ordinary Least Squares (OLS) and by White test

Comparison of standard errors estimated with OLS and White						
	1998-2007	2001-2004	2005-2007	Environmental	Social	Governance
StDev by OLS	0.1513	0.1511	0.1616	0.1473	0.1553	0.1683
StDev by White	0.1464	0.1529	0.1616	0.1454	0.1728	0.1662
Heteroscedasticity	*	*	-	*	*	*

Notes: When the standard errors are not equal, heteroscedasticity is present, which is denoted by *.

As can be observed from Table 15, there is a slight heteroscedasticity problem with all but 2005-2007 sample. This might indicate that instead of the standard OLS regression, the Generalized Least Squares (GLS) regression could be more efficient (see 7.4). Due to the very small differences in standard deviations, I would conclude that heteroscedasticity would not appear to be a serious problem in this study.

7.3 Durbin-Watson statistic to measure autocorrelation

The Ordinary Least Squares (OLS) regression analysis uses time series data and it is assumed that the error terms are uncorrelated. Nevertheless, it is common that with time series data autocorrelation of error terms exists and can bias the results. Autocorrelation refers to the correlation of a time series with its own past and future values. This would imply that a time series is predictable. The problem arises, when the disturbance terms are autocorrelated. Since standard regression model includes the assumption of independent disturbance terms between observations this could lead to biased results. Positive autocorrelation, for example, would lead to underestimation of the standard errors and the t-values will be biased upwards. The variance of the error term would also be underestimated so that R squared will be exaggerated. Therefore, the Durbin-Watson statistic was constructed to test for autocorrelation. Typically, the tabulated bounds for the critical values of DW-statistic are used to test the hypothesis of zero autocorrelation against the alternative of positive first-order autocorrelation, since positive autocorrelation is much more common than negative autocorrelation. Thus, the hypothesis tested is H_0: $\rho=0$ versus the alternative H_1: $\rho>0$, where ρ denotes the sample autocorrelation of the residuals. The Durbin-Watson test statistic is approximately equal to $2(1-\rho)$ and is defined as:

$$d = (\sum_{t=2}^{T}(\hat{e}_t - \hat{e}_{t-1})^2) \,/\, (\sum_{t=1}^{T}\hat{e}_t^2) \tag{18}$$

Thus, d = 2 indicates no autocorrelation. The value of Durbin-Watson statistic always lies between 0 and 4. If the DW-statistic is substantially less than 2, there is evidence of positive serial correlation. However, if Durbin–Watson is less than 1.0, there may be cause for alarm, because small values of DW-statistic indicate successive error terms are close in value to one another, or positively correlated. Correspondingly, if the DW-statistic (d) is greater than 2, successive error terms are much different in value to one another, which imply they are negatively correlated. In regressions with time series data this can imply an underestimation of the level of statistical significance.

A complication with interpreting the DW-statistic is that the probability distribution of d depends on the data matrix X. Thus, it is not possible to tabulate critical values that can be applied to all models. Instead, upper and lower bounds for the critical values have been established. At 99% significance level the critical range of d is 1.611-1.637 and in 95% significance level, the range is 1.654-1.694. Table 16 reports the Durbin-Watson statistics for the six samples.

Table 16: Durbin-Watson statistics for each sample to test autocorrelation of error terms

Durbin-Watson statistics for detecting autocorrelation						
	1998-07	2001-04	2005-07	Environmental	Social	Governance
Durbin-Watson	2.31	2.16	2.33	2.46	2.12	2.07
Positive autocorrelation	-	-	-	-	-	-

Notes: - denotes acceptance of H0: $\rho=0$ versus H1: $\rho>0$ at 99% significance level.

As the DW-statistics convey, there is no positive autocorrelation of error terms in the time series data used. Therefore, the results obtained by the ordinary least squares regression (OLS) are not biased by autocorrelation and the assumption of uncorrelated error terms is justified.

7.4 General Least Squares (GLS) regressions

Since the OLS regression is inefficient in heteroscedastic models, and there was slight heteroscedasticity present in the model estimated in this study, I used also the Generalized Least Square (GLS) regression, which is the Best Linear Unbiased Estimator (BLUE). The GLS estimator works by transforming the model into a homoscedastic one and applying OLS to the transformed model. By dividing all observations by the square root of x_i, the model will transform from heteroscedastic into homoscedastic and a new model with correct t-statistics can be estimated using the least squares regression. (Ogunc and Hill, 2008)

The market model estimated with GLS was then used to determine the event period abnormal returns. The cumulative abnormal returns and their statistical analysis are reported in table 17.

Table 17: Statistical analysis of cumulative abnormal returns (CAR) determined by model estimated with GLS regression

Statistical analysis of cumulative abnormal returns (CAR) determined using GLS regression					
Portfolio	CAR	VAR(CAR)	StDev(CAR)	Z-value	Significance
2001-2007	-1.29 %	0.0000	0.0054	-2.3875	**
2001-2004	-2.23 %	0.0001	0.0092	-2.4071	**
2005-2007	-1.16 %	0.0000	0.0043	-2.7160	***
Environmental	-3.37 %	0.0001	0.0100	-3.3788	***
Social	1.27 %	0.0000	0.0050	2.5245	**
Governance	-5.69 %	0.0003	0.0172	-3.3039	***

Notes: The rejection of the H_0: abnormal returns = 0 at 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Estimation window of 120 days was used to estimate the market model.

The results obtained by GLS regression are very similar to those estimated with the OLS regressions: The event period cumulative abnormal returns (CAR) are significantly negative for all portfolios but the social sample, which is significantly positive. The CARs are slightly smaller calculated by the model estimated with GLS, but the direction of the reaction is the same and all abnormal returns are statistically significant. Therefore, the conclusions drawn from the short-term analysis hold.

7.5 Long-term study with MSCI sector indices as the alternative reference portfolio

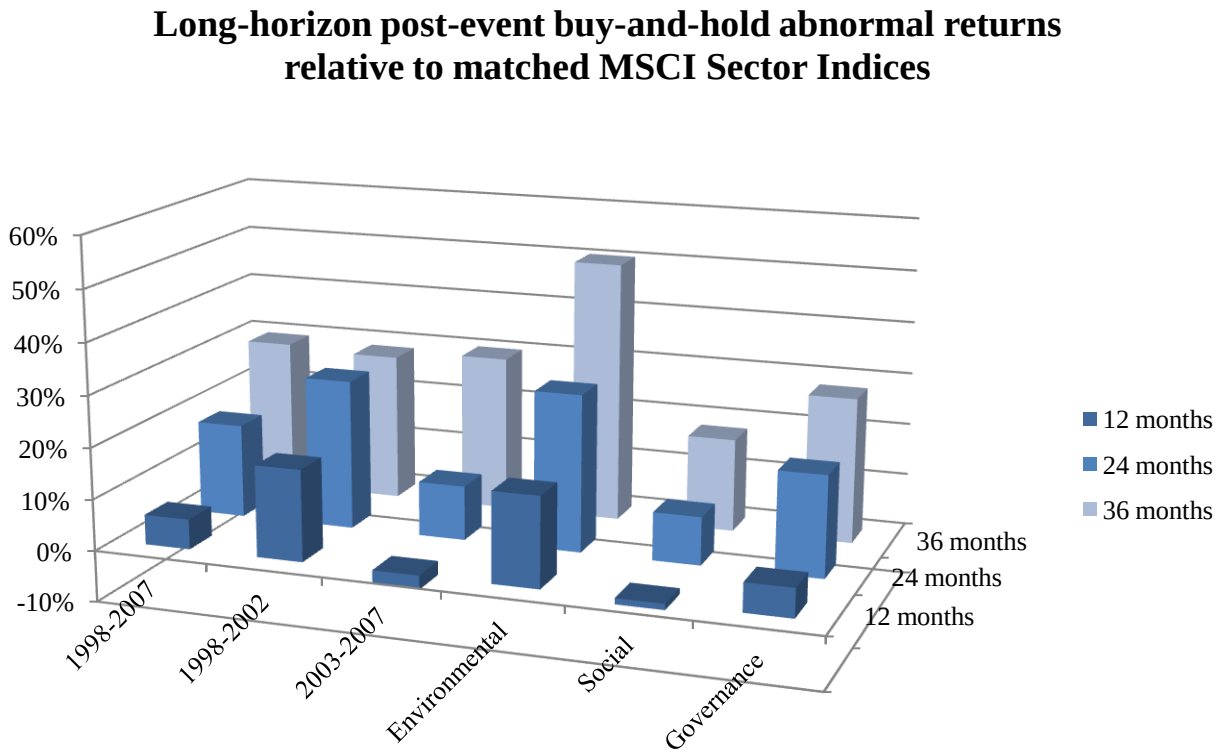
A possible source of error in the long-term study is the benchmark used to estimate abnormal returns. As explained earlier, while using indices is a popular choice; it is not optimal for long-term event studies due to several biases. I used a matched firm control sample as the reference portfolio, which method has proven to solve many of the problems related to the use of indices. However, it is undeniable that the actual formation of the matched sample is subjective to certain extent. Therefore, as a sanity and robustness check, all long-term calculations were conducted using the alternative reference portfolio compiled of MSCI Sector Indices as well.

Comparative analysis of the results is likely to lead to more credible conclusions, even though results from the use of the matched control sample will be emphasized. It should be kept in mind that differences between results obtained using different benchmarks are to be expected as the two

differently formed reference portfolios suffer from different limitations. In this section I will present the results from buy-and-hold abnormal return approach and calendar-time approach using the index reference portfolio as a benchmark.

7.5.1 Buy-and-Hold approach

Figure 14: Long-horizon buy-and-hold abnormal returns (with index reference portfolio)



The buy-and-hold abnormal returns in figure 14 have been calculated relative to the reference portfolio that consists of corresponding sector indices. Compared to the BHARs calculated with the matched sample portfolio the figure draws a similar picture for the total sample: Significantly positive for all holding periods. There are portfolio specific differences, however, especially in the 3-year BHARs between the results. This mainly underlines the difficulty of measuring long-term abnormal returns and the great dependence of the results on the reference portfolio. Especially the use of indices lowers the reliability of the 36-month BHARs because of the new listing or survivor bias, the rebalancing bias, and the cross correlation that tend to increase with longer time horizon.

Table 18: Specification of buy-and-hold abnormal returns measured with MSCI Sector Indices

This table summarizes the results from the buy-and-hold abnormal return (BHAR) approach to estimating long horizon (12, 24, and 36 months) abnormal returns using reference portfolios compiled of MSCI Sector Indices.

Specification of buy-and-hold abnormal returns measured with MSCI Sector Indices

	1998-2007	1998-2002	2003-2007	Environmental	Social	Governance
12 months						
Average	5.82 %	17.71 %	-2.68 %	17.42 %	-1.16 %	5.59 %
StDev	0.371	0.408	0.318	0.466	0.244	0.396
t_{sa} value	1.909	4.613	-0.696	2.902	-0.329	0.992
Significance	*	***	-	***	-	-
24 months						
Average	18.22 %	28.98 %	10.54 %	30.33 %	9.30 %	19.55 %
StDev	0.535	0.547	0.516	0.605	0.419	0.580
t_{sa} value	4.468	4.850	1.952	3.508	1.544	2.862
Significance	***	***	*	***	-	***
36 months						
Average	29.53 %	28.67 %	30.14 %	50.42 %	18.05 %	28.08 %
StDev	0.721	0.610	0.796	0.879	0.663	0.651
t_{sa} value	5.393	4.106	3.866	4.697	1.858	3.370
Significance	***	**	***	***	*	***

Notes: 2-tailed t-test: the rejection of the H_0: abnormal returns = 0 at 90% level is denoted as *, 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Acceptance of H_0 is denoted as - . t_{sa} refers to skewness adjusted t value. One month is assumed to equal 21 working days.

Overall, the range of BHARs defined by the indices is wider: Minimum -2.68% (12-month BHAR for 2003-2007) to maximum +50.42% (36-month BHAR for environmental sample). Corresponding minimum and maximum BHARs with matched control sample are 1.33% and 30.62% (12- and 36-month BHAR for social sample). The biggest difference between the results relates to the environmental sample portfolio. The results obtained with matched control sample, suggested the most significant buy-and-hold abnormal returns for environmental sample are gained when the portfolio is held for only 12-months. However, relative to index reference portfolio, it would seem beneficial to hold the portfolio for 36 months as BHAR for 36 months is the highest and most significant.

From the earlier results (matched sample reference portfolio) was concluded that in order to benefit from the ESG event in for of buy-and-hold abnormal returns, investors need to hold their portfolio longer now than in the beginning of the decade. This conclusion can also be drawn from these results (index reference portfolio).

7.5.2 Calendar-time portfolio approach

Figure 15: Mean Monthly Abnormal Returns on time period portfolios relative to matched index portfolios using the calendar-time approach

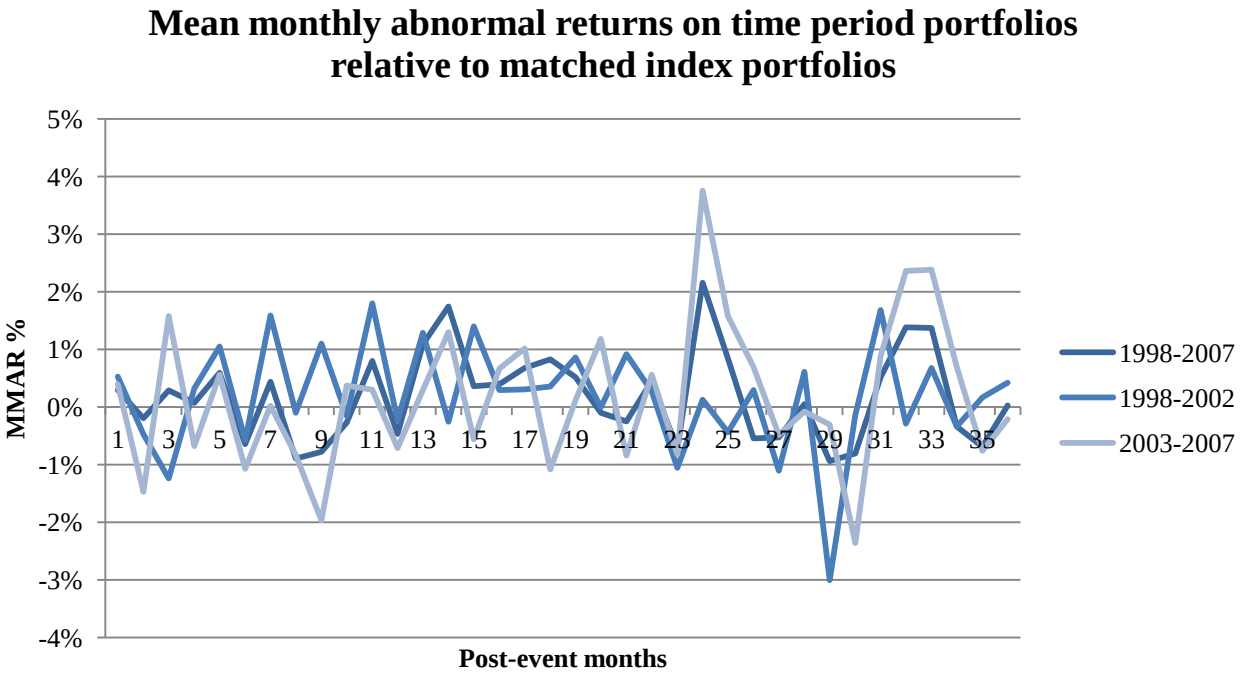


Figure 16: Mean Monthly Abnormal Returns on news category portfolios relative to matched index portfolios using the calendar-time approach

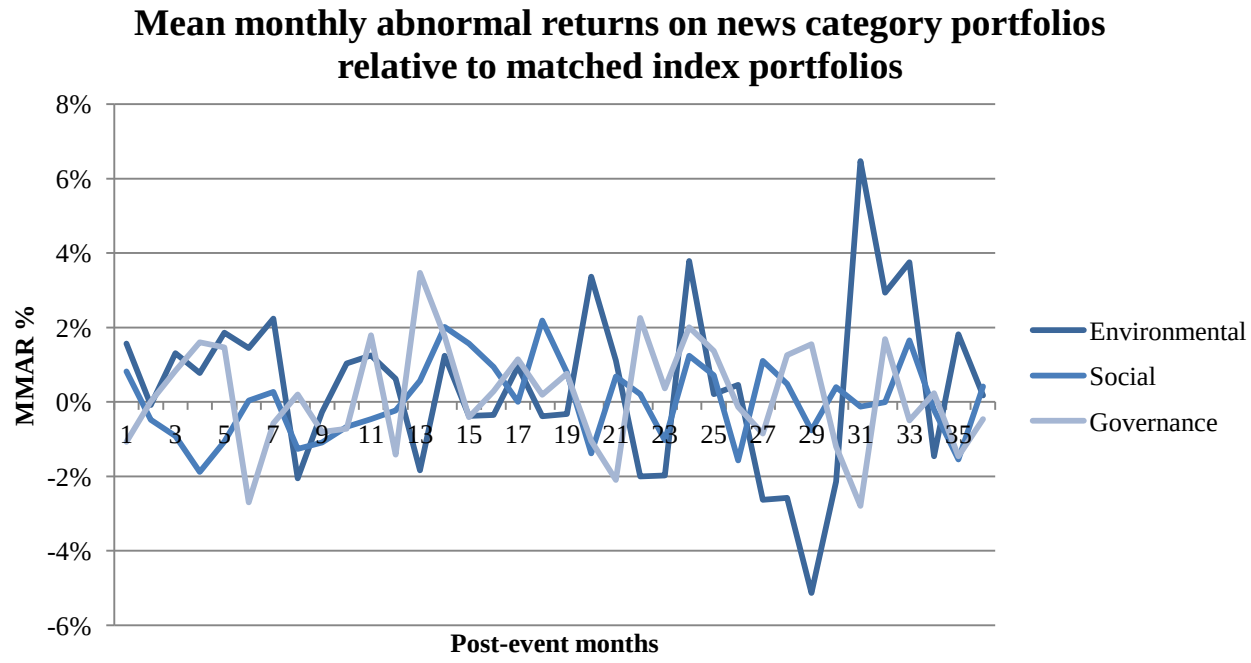


Table 19: Specification of Monthly Calendar-Time Portfolio Abnormal Returns relative to MSCI Indices

The analysis in this table is based on the results from the calendar-time portfolio approach to estimating long horizon (12, 24, and 36 months) abnormal returns using reference portfolios compiled of MSCI Sector Indices.

Specification of Monthly Calendar-Time Portfolio Abnormal Returns relative to MSCI Indices

	1998-2007	1998-2002	2003-2007	Environmental	Social	Governance
12 months						
MMAR	-0.06 %	0.30 %	-0.29 %	0.81 %	-0.58 %	-0.11 %
var	0.000	0.000	0.000	0.000	0.000	0.000
StDev	0.006	0.009	0.010	0.012	0.007	0.014
t value	-0.392	1.122	-1.012	2.411	-2.713	-0.291
Significance	-	-	-	**	*	-
24 months						
MMAR	0.27 %	0.34 %	0.09 %	0.54 %	0.04 %	0.31 %
var	0.000	0.000	0.000	0.000	0.000	0.000
StDev	0.008	0.008	0.012	0.016	0.011	0.015
t value	1.716	2.075	0.347	1.676	0.160	1.010
Significance	*	**	-	-	-	-
36 months						
MMAR	0.19 %	0.18 %	0.18 %	0.41 %	0.04 %	0.17 %
var	0.000	0.000	0.000	0.000	0.000	0.000
StDev	0.008	0.009	0.013	0.022	0.011	0.014
t value	1.440	1.181	0.859	1.113	0.222	0.696
Significance	-	-	-	-	-	-

Notes: 2-tailed t-test: the rejection of the H_0: abnormal returns = 0 at 90% level is denoted as *, 95% significance level is denoted as **, and the rejection at 99% significance level is denoted as ***. Acceptance of the H_0 is denoted as - . One month is assumed to equal 21 working days.

Based on the t tests conducted on the mean monthly abnormal returns calculated using the monthly calendar-time portfolio approach and the matched MSCI Sector Indices as the reference portfolio, the sample portfolios *do not* persistently earn post-event abnormal monthly returns. As can be seen from the table 19, most t-values are insignificant. Even though some t values suggest significant mean monthly return, the evidence is quite random and contradictory to results gained with the matched portfolio as reference and therefore not convincing enough to claim persistent post-event abnormal returns.

The table 19 above illustrates the results from the statistical analysis of the mean monthly abnormal returns calculated using the monthly calendar-time portfolio approach and the reference portfolio made of MSCI Sector Indices. The t-values are notably higher and more often statistically

significant compared to the results for MMAR estimated with the matched portfolio. The main reason for this is that the standard deviation of MMARs are notably lower when they are calculated using the index portfolios, which directly affects the t-values. This observation could be approximated also from comparing the figures 12-13 and 15-16.

Consistent with earlier results with matched sample as the benchmark, the peaks are not alarmingly high and no clear patterns in behavior of mean monthly abnormal returns are observable from the Figures 14 and 15.

Overall, the MARs calculated relative to the matched reference portfolio and the index reference portfolio appear similar. On average, the range of the zigzag is narrower, around ±3% (instead of ±4%) and the largest peak (environmental portfolio MAR in month 32) is about the same (~ +6%). However, on an individual portfolio MAR level, the direction of the abnormal return for a specific month is in some cases the opposite or the MAR is significantly smaller. For example, the MAR for environmental portfolio in month 22 is about -6% when calculated relative to the matched portfolio, but is only approximately -2% when compared to the index reference portfolio.

In general, the results from long-term study using indices as benchmarks largely supported conclusions drawn from the results from long-term analysis using matched sample portfolio. In cases where the results significantly differ depending on which reference portfolio is used, it is assumed that the true market reaction lies somewhere in the middle ground. As discussed, both reference portfolios suffer from limitations (different from one another) that can bias the results. It is possible that the two sets of results reflect opposite extremes. Nevertheless, like earlier studies suggests, I will emphasizes results from using the matched control portfolio.

7.6 Filtering event data

The adequacy of the event data is mainly based on the initial screening process of the events. However, a second screening was done after the first calculations. In some cases, the buy-and-hold abnormal returns (BHARs) deviated so radically from the mean that there was reason to suspect either the ESG-news event had not been the sole factor inducing abnormal returns or the impact of the news had been so extreme that including the case in the sample would jeopardize the universality of the results. All cases with a standard deviation of ±5 or higher/lower from the sample mean BHAR were excluded from the sample and the calculation were rerun with the smaller sample. The original sample of 150 cases decreased to 123 after all screens.

When examined the short term abnormal returns individually, the most extreme cases were observed to deviate dramatically despite of the screening. As a robustness check, the regressions and statistical tests were rerun without the most extreme cases, but the results did not change significantly.

8 Analysis

The two research problems for this study were:

1. How do negative ESG-news affect companies' stock returns in the short- and long-run?
2. Has the market reaction to negative ESG-news changed over time?

In this section, I will analyze the empirical results and their implications and explanations with the purpose of answering the two research problems. The analysis has been divided into three sections to examine the three hypotheses of this study separately and how the empirical evidence either supported or objected to them. I will also discuss probable explanatory factors and scenarios for the specific market reactions.

8.1 Short-term market reaction

H1: Negative ESG related company specific news article induces a significant negative stock price reaction in the short-term.

8.1.1 Overall short-term impact of ESG-news

The empirical results from the regression analysis of short-term abnormal returns showed that markets react negatively to negative ESG-event reportages. The news induced significant (at 99% level) negative cumulative abnormal returns (of -3.129% by OLS with 120-day estimation window, -2.954% by OLS with 200-day estimation window, and -1.29% by GLS with 120-day estimation window). Therefore, *the hypothesis 1 (H1) is accepted*.

Even though previous studies had shown conflicting empirical evidence, the evidence from this study is straightforward regarding the significance of abnormal return induced by the ESG incident reportage. The initial market reaction was negative and significant across all samples.

Based on the ±5 day abnormal returns, it's apparent that the initial market reaction took place already on day -4. The abnormal return on day -4 for the total sample portfolio was -2.313 %. Based on this phenomenon, it could be argued that print media is old news. The information was had already reached the market, on average, 4 days before the Financial Times published the news.

Since it is the job of professional investors to know what's going on in the companies they are investing into and to anticipate the markets' reaction, they are actively seeking information. Different professional databases and news channels, such as Reuters and Bloomberg, ensure that the investors are not depended on printed media for information. Naturally TV and the Internet enable also less professional investors to receive information more quickly than by waiting for the morning paper.

After the initial plunge, all portfolios experienced a partial recovery. One explanation could be an increased demand of the stock, which could be considered as undervalued after the overreaction on day -4. Another could be increased information, which eases the uncertainty. On the day +4, all portfolios faced a second drop in returns. On average, the abnormal return fell 0.797 % points to the level of -0.453 % of abnormal return. This collective plunge could suggest that again, more information had been published about the incident, its severity, and the likely implications to the firm and/or its shareholders have become clearer. The fall in returns could imply that this complementary information is even more negative than the market was expecting at that point.

The analysis of ±5 event window abnormal returns revealed, in addition to the negative initial market reaction, the increased uncertainty due to the event. Despite of the apparently quick recovery from the initial shock, a zigzag movement of abnormal returns during the eight days after the initial reaction reflects this uncertainty. Most likely, this is also a period of reassessment of values, priorities, and investment strategies for the current shareholders and potential shareholders, which would externalize as random up and down movement in abnormal returns.

8.1.2. Short-term reaction to reportage of environmental violations

The cumulative abnormal returns for the environmental portfolio were significantly negative (CAR: -4.952 %) and the initial abnormal return on day -4 (AR: -3.864 %) was the second most dramatic compared to the other sample portfolios. *The hypothesis 1 (H1) is accepted*.

This result is consistent with for example Tommy Lundgren and Rickard Olson's short-term event study results on environmental incidents. They discovered that, in Europe, negative events are generally associated with negative returns. Lundgren and Olson estimated the average initial abnormal return to be -1.6 %, which is slightly lower than the results of this study, but nevertheless statistically significant.

According to Karpoff, Lott, and Wehrly (2005), the losses in market value (two-day stock price reaction of -1.69%) correspond to the legal penalties followed the environmental violations.

However, the legal penalties are unlikely to explain the whole market reaction in this study, as the market reactions to the initial announcement of the events were studied, at which time the legal penalties are yet unknown. It is true that financial consequences from environmental violation can be severe and it is possible that part of the market reaction is due to an expected fine that will likely be imposed sometime in the future. The investors may be anticipating plausible legal penalties, but it's unlikely the change in stock returns at the time of the initial announcement would exactly correspond to the legal penalties that realize months or years later. Therefore, I conclude that there are nontrivial reputational penalties involved in the market reaction.

8.1.3 Short-term reaction to reportage of socially irresponsible behavior

In contrast to the results on the other sample portfolios, the social portfolio faced significantly positive cumulative abnormal returns (+1.10 %), despite of the initial negative abnormal return of -0.19 %. *The hypothesis 1 (H1) is inconclusive.*

As opposed to environmental and governance violations, negative social incidents don't necessarily break laws. Mass-layoffs, poor working conditions, or low wage-levels that might lead to e.g. strikes, might not violate any local government regulations and might not as such induce any penalties. Even though large strikes are often expensive especially for manufacturing companies, the savings achieved from closing down production facilities due to overcapacity can, and often do, overcome these costs. Assuming investors understand this, it could explain why even the short-term abnormal returns can be positive.

Company restructures, adjustments to production capacity, and developing operations are often not just profitable but also vitally important for the company. When the management makes decisions of this kind, which lead to unpopular changes and layoffs, it can serve as a sign of the management's a competence. Chen, Mehrotha, Sivakumar, and Yu (2001) studied layoffs and achieved similar results to this study. They found that despite of the initial two-day -1.2% abnormal return, in the long-term the performance of the company improves. As 47% of the social-category's news are about mass-layoffs, this phenomenon is likely to affect the results of this subsample.

The sample included also news about allegations of a corporate wrongdoing against an individual employee. It is quite rare for an individual to rise against a large corporation to defend his/her rights, and even when they do, the economic consequences from the company's point of view are often insignificant even if s/he would win the case. Based the empirical results of this study, reportage of

negative incidents influencing a person or a society is not considered important or significant enough to affect the stock returns negatively.

8.1.4 Short-term reaction to reportage of corporate governance crime

Reportage of corporate governance violations induced the most dramatic short-term abnormal returns. The initial AR was -2.9% and the 11-day CAR was -5.5%. *The hypothesis 1 (H1) is accepted*.

This result is compatible with Bauer and Brown's (2005) findings. They measured a ±5 day cumulative abnormal return of -4.33 % after an allegation of corporate fraud. Also Bauer and Brown discovered a significant drop in share price right before announcement, which implies rumors hit the market before the official news.

Similar to environmental violations, corporate governance violations can lead to severe legal penalties and it is likely that some of the market's reaction to the news is attributable to that. If the duty of care is violated, shareholders can initiate lawsuits. In addition, violating governance regulation can lead to a loss of trust toward the management. In their study, Marciukaityte et al. (2006) found that after being accused of corporate fraud, often leads to changes in the company's board of directors. Changing the board of directors is aimed to reinstate the investors' confidence in the company.

Karpoff et al. (2005) argued that reputational penalties are higher for corporate governance violations, because environmental violations rarely harm directly the company's customers, employees or suppliers. This theory is consistent with the results of this study as the governance news had a greater negative impact than the environmental news.

Corporate governance crimes include also e.g. accounting frauds, which could mean that the financial information published about the company has been inaccurate or plain false. The price reaction can thus reflect the uncertainty of the company's actual economic health and future prospects (based on financial information). Historically, many companies that have committed accounting fraud have gone bankrupt after being caught. I have excluded the companies that have gone bankrupt soon (within three years) of being accused of governance crime, so that the impact on stock returns measured in this study is not biased by the falling stock prices of companies going under.

8.2 Long-term market reaction

It is not intuitive to whether market should react positively or negatively in the longer-term to negative ESG-events. In this chapter I will recap the long-term empirical evidence and determine whether or not hypothesis 2a and 2b are accepted or rejected in regard to long-horizon buy-and-hold returns and monthly mean abnormal returns.

H2a: The price effect of the ESG news article is significant and negative in the long-term.

H2b: The price effect of the ESG news article is significant and positive in the long-term.

8.2.1 Evidence from post-event buy-and-hold abnormal returns

8.2.1.1 Overall long-term impact of ESG-news and possible explanations

The buy-and-hold abnormal returns were estimated for post-event holding periods of 12, 24, and 36 months to measure the investor's actual experience after an ESG- event has been reported in a newspaper. Based on the total sample of 123 cases, the buy-and-hold abnormal returns for horizons 12-, 24-, and 36-months are positive (8.97%, 14.10%, 24.94% respectively) and statistically significant (at 95% or 99% level). Since the long-term effects were not negative for any of the samples, it can be stated that *the hypothesis 2a (H2a) can be rejected and hypothesis 2b (H2b) accepted*.

The result of positive long-term buy-and-hold returns on stock of companies that have acted irresponsibly is in line with the results of long-term study of Brammer, Brooks and Pavelin (2006). They studied the 1,2 and 3-year stock returns and found that companies scoring highly on ethical criteria represent poor investments and that there are considerable abnormal returns available from holding a portfolio of socially least desirable stocks.

Brammer et al. (2006) suggest considering behavioral explanations in addition to standard risk-based models. It is possible that an altruistic private or institutional shareholder is willing to give up returns in exchange for a clear conscience. This would lead to required returns being lower for those firms. Also, the actual costs of being responsible (and earning a high CSR score) affect the bottom line of the company negatively. If the shareholders fail to account for this, the companies that engage excessively in CSR activities will be punished by the market in the form of lower share price. (Brammer et al. 2006)

In their paper, Kaustia, Laukkanen, and Puttonen (2009) remind that the conventional asset pricing model would oppose to the idea that ethically responsible companies should provide superior

returns. As discussed in chapter 2.2, any good characteristic priced by the market is associated with lower instead of higher return expectations, because a good rating in the characteristic causes a decrease in the required return. Lower required return would lead to a higher current stock price and a lower future return on average (Kaustia et al. 2009). However, in order for the market to price the stock correctly, the investors are assumed to be aware of whether or not the company is ethically responsible. If the news about an ESG crime is indeed news to the market, it would be expected for the price to be corrected according to the new status of "irresponsible" company.

So a possible explanation for positive long-term abnormal returns on a stock of an ethically irresponsible company is the aforementioned theory that the unethical behavior is in fact already included in the stock prices. However, in reality, the investors cope with imperfect and asymmetric information, and it is somewhat unlikely that all companies accused of ESG-violation in the sample had been correctly priced in advance.

One could also appeal to the short memories of investors. It is possible investors simply forget about corporate indiscretions of the past.

"Investors have very short memories." (Roman Abramovich)

However, the financial theory doesn't support strategies based on short-term memory for longer-term investors. In his book "Risk Finance and Asset Pricing: Value, Measurements, and Markets", Charles S. Tapiero discusses (among other things) persistence and short- and long-term memory models. They differ from the Markov model, which emphasizes the dependence on the current state instead of how it came to being. In short-term memory models the probability of stock price increasing or decreasing is a function of the current price and the prices assumed in the previous cases. According to Tapiero, empirical evidence shows that memory is common in intraday data and could be useful in high-frequency trading with trades that are defined by the past change in prices over the past minutes.

Nevertheless, when holding a stock for a longer period of time, investors should consider past events as they are likely to affect future events. Long-run memory assesses the probability of current events based on long-past events. Tapiero believes there is a strong case for technical forecasting on stock prices: If speculative prices exhibit dependency that would be inconsistent with rational expectations. According to this logic, it would be irrational for investors to leave out ESG-events when modeling expected future returns. (Tapiero, 2010)

8.2.1.2 Variance in BHARs of different news category samples

Contrary to the findings of Brammer at al. (2006), there was variation in the buy-and-hold returns (BHAR) of different news category samples and different holding periods. Highest 12-month BHAR (14.90%) was earned by environmental portfolio, highest 24-month BHAR (20.59%) was earned by governance portfolio and the highest 36-month BHAR was earned by social portfolio. Social and governance portfolios' BHAR increased as the holding period increased, but the environmental portfolio's 24-month BHAR was lower than its 12-month BHAR. This result might be linked to the savings and/or costs and their deferral induced by the events. The high one year BHARs and lower two and three year BHARs of the environmental portfolio could be explained by the short-term savings from e.g. not disposing of waste properly, and the long-term costs of legal penalties that are likely to be realized months after the event because of legal bureaucracy. So neglecting environmental regulation could save money in the short term (~ a year), but the sanctions from doing so can induce costs on the second or third year. Since it could take over a year before the official decision on who is responsible for the environmental violation, there could be a second market reaction based on reputational costs taking place when this information is confirmed and published.

Most of the social category's events in this study were related to corporate restructuring. The slowly increasing BHARs can be explained by the initial costs of e.g. layoffs (golden handshakes) and closing down plants, and the gradual savings and performance improvements. The different holding period BHARs for governance (12.96%, 20.59%, and 24.48%) suggest that the legal penalties that could follow, were imposed on the third year.

Also the accumulation of BHARs earned by the governance portfolio slows down with the increase of the holding period length. As assumed with the other cases, this could imply that the consequences of the ESG-violation realize during the third year.

8.2.2 Evidence from calendar-time mean monthly returns

With the purpose of discovering whether there is persistence (temporal causality) in the sample portfolios' abnormal post-event returns, the mean monthly abnormal returns (MMAR) were estimated by using the reference portfolios of matched control sample and matched indices.

All MMARs were statistically insignificant. Thus, the empirical evidence supports the conclusion that *the sample portfolios do not persistently earn post-event abnormal monthly returns*.

There was variation in the sign of the MMAR of different portfolios and different lengths of estimation period, but most were positive. A few of the MMARs calculated relative to the sector index reference portfolio were significant at 90% or 95% level of significance. However, in general, the results were trivial.

Since the buy-and-hold abnormal returns were consistently positive and significant, I conclude that the negative ESG event reportage does have a positive long-term effect on returns, but that the abnormal returns are not persistent through the post event months. This implies that it is more difficult for short-term investors to benefit from the positive effect.

8.3 Evolution of the market reaction

Before conducting this empirical study, I hypothesized that the market reaction could have changed over time as the attention corporate sustainability and ethical behavior receives has grown remarkably during past years. For example, Ioannis Ioannou and George Serafeim (2010) found evidence that socially responsible firms receive more favorable recommendations in recent years relative to earlier ones. Their analyst recommendation data and stock market data was collected from years 1993-2008. Their findings suggest a changing perception of the value of such strategies by the analysts (Ioannou and Serafeim, 2010).

H3: The market reaction to ESG related news has changed over time.

In this section, I will evaluate the short- and long-term results from the perspective of whether or not to accept the hypothesis 3 (H3).

8.3.1 Short-term evidence

The short-term study was conducted with event study from years 2001-2007 and the sample was divided by the date of publication of the article into two samples: 2001-2004 and 2005-2007. The short-term cumulative abnormal returns from the event window of 11-days were -2.19% for the sample portfolio 2001-2004, and -3.99% for the sample portfolio 2005-2007. The statistical significance of the cumulative abnormal returns was significant for both samples at the 99% confidence level. Thus the short-term market reaction has clearly become stronger. Also the initial market reaction (on day -4) has become stronger and more negative (from -1.821% to -2.736%). Therefore, the short-term market reaction has changed over time and *the hypothesis 3 is accepted*.

8.3.2 Long-term evidence

8.3.2.1Buy-and-Hold returns

The event data was collected from years 1998-2007, and was divided into two five year samples 1998-2003 and 2004-2007 in order to evaluate whether a change in market reaction had taken place. Therefore, as explained before, the buy-and-hold abnormal returns (BHAR) were measured separately for these samples as well.

The 12-month buy-and-hold abnormal returns had clearly decreased: From approximately 18.74% to 1.99%. Similarly, the 24-month BHAR decreased from 23.80% to 7.16%. However, the 36-month BHAR had increased from 18.92% to 29.24%. Exactly the same phenomenon was observable, when the BHARs were estimated using the sector index portfolios. Clearly a change in market reaction has taken place and therefore, *hypothesis 3 is accepted*.

Based on the empirical evidence, it would seem that it is more difficult now to earn long-term abnormal returns during the first two post-event years as it was before. Nevertheless, investors willing to hold the unethical companies in their portfolios for three years have the opportunity to earn even higher abnormal returns than in the beginning of the decade.

8.3.2.2. Calendar-time mean monthly abnormal returns

For the comparative analysis, also mean monthly abnormal returns (MMARs) were calculated for the two five-year samples (news published during 1998-2002 and 2003-2007) to find out whether there was a difference related to time.

The phenomenon observed with BHARS can be observed also when comparing MMARs: The MMAR of 12- and 24-months had decreased and the 36-month MMAR had increased. Contrary to BHARs, the MMARs were insignificant 1998-2002 and insignificant in 2003-2007. Thus, even though a change can be observed in the MMARS it is not statistically significant. Robustness check of calculating MMARs with the sector index portfolios support this conclusion. In terms of earning persistently abnormal monthly returns after the ESG event, the market reaction has not changed over time and *hypothesis 3 is rejected.*

9. Conclusion

The purpose of this thesis was to study and evaluate the public attitude and reactions to reportages of environmental, social, and corporate governance related corporate misbehavior as they externalize in changes in the investors' investing behavior, in other words, in stock returns.

The main findings of this research suggest that negative ESG-news induce a statistically significantly negative market reaction in stock returns in the short-term and a positive in the long-term. Also, significant buy-and-hold abnormal returns were observed during the three post-event years. However, abnormal returns were not persistently present in each month. The news category of environmental, social or corporate governance influenced significantly the extent and direction of the market reaction.

The empirical results also suggest a change in market reaction over time. The short-term negative reaction has intensified over the years, the long-term buy-and-hold abnormal returns for holding periods of 12- and 24-months have decreased, and the 36-month buy-and-hold returns have increased.

H1: Negative ESG related company specific news article induces a significantly negative reaction to stock returns in the short-term.	
H2a: The effect on stock returns of the ESG news article is significantly negative in the long-term.	
H2b: The effect on stock returns of the ESG news article is significantly positive in the long-term.	
H3: The market reaction to ESG related news has changed over time.	

The empirical results indicate an initial *overreaction* by the market and relatively quick recovery. It is possible to aim to exploit this phenomenon to earn abnormal returns, but it would very be difficult with only few unethical stocks. The results of this study are generalized averages of over a hundred cases and are not directly applicable to estimating the outcome of individual cases.

From the investor's perspective, it appears that the most profitable strategy would be to buy the undervalued stock right after the initial plunge and hold it in the investment portfolio for at least a year, benefiting both from buying at discount and from the buy-and-hold abnormal returns at annual level. The ideal holding period depends on the news category. After environmental news, the buy-and hold abnormal returns are highest with 12 month holding period, and after social and governance news, it would appear to be profitable to hold the stock for 36 months.

The results of this study don't encourage remedial actions at strategic or operative level by the companies (ceteris paribus). Nevertheless, the findings of intensified negative reaction and decreased positive long-term returns over time support the theory of the increased role and importance of corporate social responsibility (Lougee and Wallace, 2008). This is likely to impact irresponsible companies' profitability, and thus CSR should be considered at least in the long-term strategy.

The private and institutional investors, who have limited their investment horizon by excluding unethically operating companies, forgo an opportunity to exploit the overreaction of the market to ESG-news in exchange for clear conscience. Since this window of opportunity and the potential financial benefits are getting slimmer, the cost of responsible investing is decreasing as well.

10. Suggestions for future research

CSR has had a slower start in the Asian Emerging Markets compared to developed markets (Cheung et al. 2010). Cultural difference as well as the stage of development of the market can influence investors' objectives, values, and priorities. This motivates a comparative study of market reaction to ESG-news between developed markets such as Europe or the Unites States and Asian Emerging Markets.

11. Appendices

11.1 Appendix 1: Example ESG news

11.1.1 Examples of negative environmental-category news articles

Example 1.

Headline: Toxic waste spill hits Spanish crops

Source: Financial Times (London, England)

Date: April 28, 1998, Tuesday

Company: Boliden AB, OMX Stockholm

Article:

"A toxic waste spill from a mine reservoir in southern Spain was killing everything in its path yesterday as it moved down rivers and man-made channels to the Gulf of Cadiz, the environmentalist group Greenpeace said.

An estimated 5m cubic meters of waste flooded into the Guadiamar river on Saturday, but was then diverted away from the Donana National Park, one of Europe's most prized nature reserves.

Instead, the tainted water, containing residues of zinc, lead calcium and other metals, was flowing into the Guadalquivir River and then out to the Gulf of Cadiz.

Jim Borland, a spokesman for the Swedish-Canadian group Boliden, which owns the mine, said that a sliding layer of ground beneath the reservoir (above) had caused the wall to break.
Spanish State television said preliminary estimates put crop losses at Pta2bn (£7.8m). "I've lost my whole crop, my whole livelihood," a tomato farmer said.""

Event period CAR: -2.6%

Example 2.

Headline: Authorities in Alaska probe BP site blast

Source: Financial Times (London, England)

Date: August 24, 2002 Saturday

Company: BP Ltd., London Stock Exchange

Article:

Alaskan authorities were yesterday investigating an explosion at BP's operation in the state, which seriously injured an operator and caused a spill that might jeopardise the terms of the company's federal probation with US authorities.

Ed Meggert, state on-scene coordinator for the Alaska Department of Environmental Conservation, said the August 16 blast was only the second such explosion in 10 years at Prudhoe Bay.

It was being investigated by his organization, the Alaska Department of Occupational Safety and Health, fire authorities and BP.

"This is both a safety problem and a maintenance problem," Mr Meggert said. "We want to know what BP should have been doing."

BP Exploration Alaska pleaded guilty in 1999 to one felony count related to the illegal disposal of hazardous waste in Alaska. The company agreed to use "best environmental practices" to protect workers, the public and the environment during five years' probation.

Paul Laird, BP spokesman in Alaska, said Don Shugak was seriously injured when sent to work on a well that BP noted was recording "high pressure". A gas leak resulted in a "fire explosion" that took six hours to put out by pumping sea water into the well, he said.

Mr Meggert said about 3,000 gallons of sea water, which is toxic to the Alaskan tundra, had to be pumped into the well to shut it off, resulting in what is considered a spill.

Charles Hamel, an advocate for BP workers in Alaska, raised the incident in a letter with US Probation Officer Mary Francis Barnes, BP Probation Monitor Ridgway Hall, and Assistant US Attorney Deborah Smith.

He claimed BP knew the well was experiencing dangerous pressure build-up but it had nonetheless been brought back on line.

"Eagerness to meet oil production goals over-ruled regulations, safety of the personnel, risk to the environment and common sense judgment," Mr Hamel said.

He said BP had "yellow tagged" up to 100 other wells with potential problems that still were carrying oil and gas. "We believe BP will be in violation of the probation terms until it shuts down and tests every 'yellow tagged' dysfunctional well."

BP's Mr Laird said the company was investigating whether other wells had similar problems.

Event period CAR: -10.34 %

11.1.2 Examples of negative social-category news articles

Example 1.

Headline: Finnish paper and pulp industry hit by strike

Source: Financial Times (London, England)

Date: April 12, 2000, Wednesday

Author: Nicholas George

Company: UPM Kymmene Corp, OMX Helsinki

Article:

"Finland's paper and pulp industry was brought to a halt by strike action yesterday in the latest of a series of industrial disputes to affect the booming Nordic country.

About 30,000 employees went on strike following the breakdown of talks in which unions and employers failed to reach agreement on wages and working hours.

The action follows similar disputes by chemical and transport workers and is seen partly as an indication of the difficulties the country is having in coming to terms with its membership of the euro. Finland's economy is forecast to grow by about 5 per cent this year with both the central bank and finance ministry warning of signs of overheating.

This is particularly true in certain industries such as construction and IT where there are labour shortages, and in the Helsinki region in general where property prices are soaring.

The current wave of strikes has mainly affected the country's export industries that have traditionally been able to absorb high wage increases through devaluations, an avenue no longer open because of the country's euro membership.

"If you look back you see that wage rises in Finland have been double those of other European countries which made the industry uncompetitive and were followed now and then by devaluation. This is not possible anymore," explained Timo Proranen, chairman of the Finnish Forrest Industries Federation.

He said the unions were demanding a pay increase of over 6 per cent as well as cuts in working hours.

The strike will cost the country FM200m (Dollars 32m, Euros 34m) in lost export earnings per day with UPM-Kymmene, one of the world's largest forestry groups, estimating the action will cost it Euros 50m (Dollars 48m) a week.

Jaana Aaltonen, of the Paper Workers Union, said the wage rise was in fact between 4-5 per cent. "We are prepared for a rather long strike, one or two weeks at the shortest," she said.

Juha Ahtola, chief economist at Merita bank in Helsinki, was more relaxed about the threat of overheating and wage pressures in the overall economy.

He pointed out that high demands were largely restricted to the export industries. Most employees in the domestic sector had already settled for around 3.1 per cent."

Event period CAR: -1 %

Example 2.

Headline: Casino staff threaten strike

Source: Financial Times (London, England)

Date: December 31, 2004 Friday

Author: Martin Arnold

Company: Groupe Partouche, Euronext Paris

Article:

“The croupier's traditional cry of "rien ne va plus, les jeux sont faits" is more urgent than ever today in France, where 17,000 casino staff are threatening to go on strike in protest over pay and working conditions.

Negotiations continued until late last night between the five trades unions representing casino workers and the two biggest employers, Casinos de France and Syndicat des casinos modernes de France, which includes the Partouche group.

But the differences between the two sides seemed too great to avoid protests disrupting France's 188 casinos on New Year's eve, usually one of their busiest days of the year, along with Valentine's day and Friday the thirteenth.

If French roulette wheels grind to a halt tonight it would be a blow for Casinos de France, formed by this year's merger of Lucien Barrie`re with the casino arm of Accor.

The deal created a group with Euros 1bn of sales, 37 casinos and 10 hotels, including Le Fouquet's on the Champs Elysees in Paris.

Unions are calling for customers to boycott casinos and for the government to suspend fiscal subsidies. Staff are angry that they have not benefited from the sector's recent growth and are demanding a 4 per cent pay rise and more days off for those working night shifts.

"Staff are not afraid of going on strike because they feel a solidarity on the part of customers," said David Rousset, head of the casino branch of the Force Ouvrie`re union.

Yet executives say night shifts are an integral part of working in the casino sector. They say that although revenues rose 2.6 per cent this year to Euros 2.6bn (Dollars 3.4bn), that is slower growth than previous years and would be in decline without the opening of new casinos.

Casino companies also complain about a growing tax burden, already at about 57 per cent, and the restrictions of the 35-hour week.

One of the main sources of tension is the rise of slot machines. Punters playing on slot machines pay no tips, meaning croupiers are losing out.

Slot machines also eat into revenues from traditional games, such as blackjack and baccarat, pushing many of them into loss.”

Event period CAR: 9.32 %

11.1.3 Negative corporate governance-category news article

Example 1.

Headline: BNP worker embezzled Euros 15m in antiques spree

Source: Financial Times (London, England)

Date: April 21, 2005 Thursday

Author: Martin Arnold

Dateline: Paris

Company: BNP Baribas SA, Euronext Paris

Article:

"BNP Paribas has uncovered an embarrassing alleged Euros 15m (Dollars 19.6m) fraud by one of its own accountants, who is said to have used the money to deck her small Paris apartment out with some of the most expensive antiques and art on the French market.

While BNP is hailing the discovery as a success for its internal controls, questions are being raised in the French bank about how the low-ranking accountant could have escaped without her scam being detected for more than three years.

Perhaps it was BNP's record profit of Euros 4.7bn last year that convinced the accountant, that she could get away with embezzling Euros 15m without France's biggest bank by market capitalization noticing.

It was only after the woman charged with handling the bank's purchasing accounts started getting greedy that she was caught in December.

Most of her biggest purchases came in the second half of last year, and auditors rang the alarm bell after finding a Euros 6.8m hole in the 2004 accounts. BNP declined to comment yesterday, except to say that no client had been affected.

The woman is alleged to have used the names of legitimate suppliers of the bank, but switched their account details with those of antique dealers.

The French press have delighted in listing some of the pieces of 17th and 18th century furniture found in the accountant's three-bedroom apartment in a high-rise block in northern Paris. A number of France's most prestigious antique dealers are being investigated by police to find out why they did not raise questions after delivering furniture worth hundreds of thousands of euros to such a small apartment.

The antiques, including Louis XVI armchairs and silver chandeliers, have been impounded. BNP is expected to sell them to recoup some of the lost money. But it is understood there are worries that the woman may have massively overpaid for some items."

Event period CAR: -3.15%

Example 2.

Headline: Swiss watchdog opens probe into insider trading at Adecco

Source: Financial Times (London, England)

Date: January 20, 2004 Tuesday

Author: Haig Simonian

Dateline: Zurich

Company: Adecco, Swiss Stock Exchange

Article:

"Switzerland's Federal Banking Commission (EBK) yesterday confirmed it had opened an investigation into possible insider trading at Adecco, the world's biggest temporary employment group.

The EBK denied it had been stung into action by the US Securities and Exchange Commission and the US Attorney's Office in New York, which are conducting investigations, and said it had previously had no reason to take the initiative.

The EBK said it had acted after information from the SWX Swiss stock exchange, the self-regulating market for which it is ultimately responsible.

However, following the decision in 2001 to set up virt-x, the new London-based exchange for trading in Swiss blue chips, dealings at the Zurich-based SWX have been restricted to derivatives. That means any investigation into alleged anomalies in Adecco shares is, strictly speaking, up to the UK's Financial Services Authority. The EBK yesterday said it had, as a matter of course, informed the FSA.

Separately, information emerged yesterday of internal conflicts that could have contributed to the procedural failures that emerged at Adecco in the past week.

The differences centred on frictions between Felix Weber, 53, who resigned last Friday as chief financial officer, and Je`rome Caille, its 37-year-old chief executive.

"Frankly, Felix thought he should have become the boss, and didn't always hide that", said one analyst. "There was a certain level of animosity".

The tension between the two men may have been inevitable given their notably different personalities and backgrounds, said analysts who have closely watched the company in recent years.

Mr Weber joined Adecco from McKinsey, the consulting group, six years ago and quickly gained a reputation as a formidable strategist, as well as an adroit and energetic communicator.

Mr Caille, by contrast, had a background almost entirely in operations. A Frenchman, his meteoric career at Adecco began at the age of 23, when he ran a branch office in Barcelona.

Mr Caille's reputation rose after taking over Adecco's Italian arm in 1997, which he expanded into one of the group's most important European operations.

Even more important, according to some analysts, he was also seen as the driving force behind the company's highly successful IT platform.

Differences between the two reached a head when Mr Weber was passed over for the job of chief executive following the appointment of John Bowmer, Adecco's driving force, as chairman. While Mr Caille and Mr Weber appeared collegial on the surface, their differences were widely known.

The lack of mutual sympathy may have had no obvious bearing on the problems that came to light this month.

Event period CAR: 9.19%

11.2 Appendix 2: Companies included in the study

Company	Exchange	News category	Matched firm	Matched index
Ericsson	OMX Stockholm	Social	Alcatel Lucent S.A.	MSCI EUROPE COMMS EQ
Societe Generale de Surveillance	SIX Swiss Exchange	Social	Umicore SA	MSCI EUROPE CONS SVS
BMW	Frankfurt Stock Exchange	Social	Fiat Spa	MSCI EUROPE AUTOMOBILES
Sears Roebuck & Co	London Stock Exchange	Social	Volkswagen AG	MSCI EUROPE AUTOMOBILES
Michelin	Euronext Paris	Social	Continental AG	MSCI EUROPE AUTO COMPO
Marks & Spencer Group PLC	London Stock Exchange	Social	Home Retail Group PLC	MSCI EUROPE M/LINE RTL
Ford Motor CO	London Stock Exchange	Social	Daimler AG	MSCI EUROPE AUTOMOBILES
UPM Kymmene Corp	OMX Helsinki	Social	Stora Enso Oyj	MSCI EUROPE PAP/FOR PRD
Coca-Cola Enterprise	Euronext Paris	Social	Carlsberg A/S	MSCI EUROPE BEVERAGES
KPN	Euronext Amsterdam	Social	Colt Group S.A.	MSCI EUROPE T/CM SVS
BAE SYSTEMS PLC	London Stock Exchange	Social	Eads NV	MSCI EUROPE AUTO COMPO
Capgemini	Euronext Paris	Social	The Capita Group PLC	MSCI EUROPE S/W & SVS
UniCredit Bank Aktiengesellschaft	Frankfurt Stock Exchange	Social	Agricultural Bank Of Greece S.A.	MSCI EUROPE BANKS
Prudential PLC	London Stock Exchange	Social	Aviva PLC	MSCI EUROPE INSURANCE
Fiat	Borsa Italiana	Social	Volvo AB	MSCI EUROPE AUTOMOBILES
Morgan Crucible CO PLC	London Stock Exchange	Social	SGL Carbon SE	MSCI EUROPE ELEC EQ
Transco	London Stock Exchange	Social	Scottish & Southern Energy PLC	MSCI EUROPE ELEC UTIL
BP	London Stock Exchange	Social	ENI	MSCI EUROPE OIL,GAS&C.FUEL
Swiss Life Group	SIX Swiss exchange	Social	European Reliance Gen. Insurance CO. S.A.	MSCI EUROPE INSURANCE
Ryanair Holdings PLC	London Stock Exchange	Social	Air France-KLM	MSCI EUROPE AIRLINES
Unilever PLC	London Stock Exchange	Social	Orkla ASA	MSCI EUROPE FD PRD
Deutsche Lufthansa AG	Frankfurt Stock Exchange	Social	Air France-KLM	MSCI EUROPE AIRLINES
Hsbc Holdings PLC	London Stock Exchange	Social	Allied Irish Banks PLC	MSCI EUROPE BANKS

Siemens	London Stock Exchange	Social	Roche Holding AG	MSCI EUROPE ELEC EQ
Ford	London Stock Exchange	Social	Peugeot SA	MSCI EUROPE AUTOMOBILES
Puma SE	Frankfurt Stock Exchange	Social	Adidas AG	MSCI EUROPE CONS DUR/APP
KarstadtQuelle AG	Frankfurt Stock Exchange	Social	Burberry Group PLC	MSCI EUROPE RETAILING
Volkswagen AG	Frankfurt Stock Exchange	Social	BMW	MSCI EUROPE AUTOMOBILES
Groupe Partouche	Euronext Paris	Social	Paddy Power PLC	MSCI EUROPE HT/REST/LEIS
Nokia	OMX Helsinki	Social	Ericsson Telephone AB	MSCI EUROPE COMMS EQ
Deutsche Bank AG	Frankfurt Stock Exchange	Social	Bank Of Ireland	MSCI EUROPE BANKS
Total S.A.	London Stock Exchange	Social	MOL Hungarian Oil and GAS Public Limited Company	MSCI EUROPE OIL,GAS&C.FUEL
Nestlé S.A.	SIX Swiss exchange	Social	Danone	MSCI EUROPE FD PRD
Swiss Reinsurance Company Ltd	SIX Swiss exchange	Social	Aegon N.V.	MSCI EUROPE INSURANCE
HSBC Bank PLC	London Stock Exchange	Social	Allied Irish Banks PLC	MSCI EUROPE BANKS
The Carlsberg Group	OMX Copenhagen	Social	Baltika Breweries	MSCI EUROPE BEVERAGES
BHP Billiton	London Stock Exchange	Social	Xstrata PLC	MSCI EUROPE MET & MIN
Deutsche Telekom AG	Frankfurt Stock Exchange	Social	Belgacom S.A.	MSCI EUROPE T/CM SVS
Eni SpA	Borsa Italiana	Social	Statoil ASA	MSCI EUROPE ELEC UTIL
Hyundai Motor CO	London Stock Exchange	Social	Peugeot SA	MSCI EUROPE AUTOMOBILES
BNP Paribas SA	Euronext Paris	Social	Banco Popolare	MSCI EUROPE BANKS
Unilever	London Stock Exchange	Social	Premier Foods PLC	MSCI EUROPE FD PRD
Allianz SE	London Stock Exchange	Social	ING Groep NV	MSCI EUROPE INSURANCE
Stora Enso Oyj	OMX Helsinki	Social	UPM Kymmene Corp	MSCI EUROPE PAP/FOR PRD
Compagnie Financiere Tradition	SIX Swiss exchange	Social	Tullett Prebon PLC	MSCI EUROPE TRAD COS/DIS
Dow Chemical CO	London Stock Exchange	Social	Royal DSM N.V.	MSCI EUROPE MATERIALS
Royal Caribbean Cruises LTD	Oslo Stock Exchange	Environmental	TUI Travel PLC	MSCI EUROPE HT/REST/LEIS
Boliden AB	OMX Stockholm	Environmental	Essilor International S.A.	MSCI EUROPE MET & MIN
General Electric	London Stock	Environmental	Siemens	MSCI EUROPE DIV

CO	Exchange			FIN SVS
BP PLC	London Stock Exchange	Environmental	Esso Societe Anonyme Francaise	MSCI EUROPE OIL,GAS&C.FUEL
Royal Dutch Shell PLC	London Stock Exchange	Environmental	ENI	MSCI EUROPE OIL,GAS&C.FUEL
Corus Group	Euronext Amsterdam	Environmental	Allianz SE	MSCI EUROPE BANKS
TotalFinaElf	London Stock Exchange	Environmental	Statoil ASA	MSCI EUROPE OIL,GAS&C.FUEL
Goldfields Ltd.	SIX Swiss Exchange	Environmental	Impala Platinum Holdings Limited	MSCI EUROPE MET & MIN
DLH Group	OMX Copenhagen	Environmental	Dalhoff Larsen & Horneman A/S	MSCI EUROPE PAP/FOR PRD
Carnival Corp	London Stock Exchange	Environmental	Royal Caribbean Cruises LTD	MSCI EUROPE HT/REST/LEIS
Tesco Plc	London Stock Exchange	Environmental	Sainsbury (J) PLC	MSCI EUROPE RETAILING
BP PLC	London Stock Exchange	Environmental	ERG S.p.A.	MSCI EUROPE OIL,GAS&C.FUEL
CRH PLC	London Stock Exchange	Environmental	Heidelbergcement AG	MSCI EUROPE MATERIALS
Toyota Motor Corp	London Stock Exchange	Environmental	Audi AG	MSCI EUROPE AUTOMOBILES
Companhia Vale do Rio Doce	Euronext Paris	Environmental	Xstrata PLC	MSCI EUROPE MET & MIN
Chevron Corporation	Euronext Amsterdam	Environmental	Repsol YPF SA	MSCI EUROPE OIL,GAS&C.FUEL
Shell Australia/ Royal Dutch Shell PLC	London Stock Exchange	Environmental	ENI	MSCI EUROPE OIL,GAS&C.FUEL
Coca-Cola Enterprise	Euronext Paris	Environmental	Carlsberg A/S	MSCI EUROPE BEVERAGES
Daimler AG	Frankfurt Stock Exchange	Environmental	Fiat Spa	MSCI EUROPE AUTOMOBILES
Swiss Syngenta AG	SIX Swiss Exchange	Environmental	Yara International ASA	MSCI EUROPE CHEMICALS
Électricité de France S.A.	Euronext Paris	Environmental	E On AG	MSCI EUROPE ELEC UTIL
BP PLC	London Stock Exchange	Environmental	ERG S.p.A.	MSCI EUROPE OIL,GAS&C.FUEL
Brenntag	Frankfurt Stock Exchange	Environmental	Ashland Inc.	MSCI EUROPE :M CONS DISCR U
ArcelorMittal S.A.	Euronext Amsterdam	Environmental	Acerinox, S.A.	MSCI EUROPE INDUSTRIALS
Bayer AG	Frankfurt Stock Exchange	Environmental	Reckitt Benckiser Group PLC	MSCI EUROPE PHARM
BASF SE	Frankfurt Stock Exchange	Environmental	Reckitt Benckiser Group PLC	MSCI EUROPE CHEMICALS
Heineken International	Euronext Amsterdam	Environmental	Baltika Breweries	MSCI EUROPE BEVERAGES
MMC Norilsk Nickel	London Stock Exchange	Environmental	Antofagasta PLC	MSCI EUROPE MET & MIN

Neste Oil OYJ	OMX Helsinki	Environmental	Galp Energia, Sgps S.A.	MSCI EUROPE OIL,GAS&C.FUEL
AstraZeneca plc	OMX Stockholm	Corporate governance	Sanofi	MSCI EUROPE PHARM
Unilever	London Stock Exchange	Corporate governance	Orkla ASA	MSCI EUROPE FD PRD
Fuji Heavy Industries LTD	Frankfurt Stock Exchange	Corporate governance	Volkswagen AG	MSCI EUROPE AUTOMOBILES
Deutsche Bank	Frankfurt Stock Exchange	Corporate governance	Allied Irish Banks PLC	MSCI EUROPE BANKS
Securitas AB	OMX Stockholm	Corporate governance	G4S PLC	MSCI EUROPE CONS SVS
Credit Suisse First Boston	SIX Swiss Exchange	Corporate governance	UBS AG	MSCI EUROPE TRAD COS/DIS
Barclays Bank	London Stock Exchange	Corporate governance	Unicredit	MSCI EUROPE BANKS
Bayerische Motoren Werke Ag (BMW)	Frankfurt Stock Exchange	Corporate governance	Volkswagen AG	MSCI EUROPE AUTOMOBILES
Pirelli & C	Borsa Italiana	Corporate governance	Nokian Tyres plc	MSCI EUROPE AUTO COMPO
Daimler AG	Frankfurt Stock Exchange	Corporate governance	Volvo AB	MSCI EUROPE AUTOMOBILES
Deutsche Telekom AG	Frankfurt Stock Exchange	Corporate governance	Belgacom S.A.	MSCI EUROPE T/CM SVS
Vodafone	Frankfurt Stock Exchange	Corporate governance	Telefonica SA	MSCI EUROPE T/CM SVS
Ixos Software Ag	Frankfurt Stock Exchange	Corporate governance	Plaut AG	MSCI EUROPE S/W & SVS
Infineon Technologies AG	Frankfurt Stock Exchange	Corporate governance	Arm Holdings PLC	MSCI EUROPE ELEC EQ
Xerox Corp	SIX Swiss Exchange	Corporate governance	Compagnie Industrielle Et Financiere D'ingenierie Ingenico S.A.	MSCI EUROPE CPU & PER
Banco Bilbao Vizcaya Argentaria SA	London Stock Exchange	Corporate governance	Allied Irish Banks PLC	MSCI EUROPE BANKS
Hsbc Holdings PLC	London Stock Exchange	Corporate governance	Allied Irish Banks PLC	MSCI EUROPE BANKS
Royal Bank of Scotland	London Stock Exchange	Corporate governance	UBS AG	MSCI EUROPE BANKS
Royal Ahold	Frankfurt Stock Exchange	Corporate governance	Morrison (WM) Supermarkets PLC	MSCI EUROPE RETAILING
Commerzbank AG	London Stock Exchange	Corporate governance	Absa Group Limited	MSCI EUROPE BANKS
AstraZeneca	London Stock Exchange	Corporate governance	Sanofi	MSCI EUROPE PHARM
Abbey National (Grupo Santander)	London Stock Exchange	Corporate governance	Banco Popular Espanol, S.A.	MSCI EUROPE BANKS
Adecco	SIX Swiss Exchange	Corporate governance	HAYS PLC	MSCI EUROPE CONS SVS
Vodafone Group plc	London Stock	Corporate	Telefonica SA	MSCI EUROPE

	Exchange	governance		T/CM SVS
BNP Paribas SA	Euronext Paris	Corporate governance	Societe Generale S.A.	MSCI EUROPE BANKS
Dexia SA	Euronext Brussels	Corporate governance	Irish Life & Permanent Group Holdings PL	MSCI EUROPE BANKS
Royal Dutch Shell PLC	London Stock Exchange	Corporate governance	OMV AG	MSCI EUROPE OIL,GAS&C.FUEL
Vivendi	Euronext Paris	Corporate governance	Belgacom S.A.	MSCI EUROPE T/CM SVS
Bank Of Ireland	London Stock Exchange	Corporate governance	Danske Bank A/S	MSCI EUROPE BANKS
Samsung Electronics	London Stock Exchange	Corporate governance	Ericsson	MSCI EUROPE ELEC EQ
TJ GROUP PLC	OMX Helsinki	Corporate governance	Know It AB	MSCI EUROPE S/W & SVS
Nokia CORP	OMX Helsinki	Corporate governance	France Telecom	MSCI EUROPE COMMS EQ
UniCredit Bank Aktiengesellschaft	Frankfurt Stock Exchange	Corporate governance	Societe Generale S.A.	MSCI EUROPE BANKS
Capita Group PLC	London Stock Exchange	Corporate governance	Logica PLC	MSCI EUROPE S/W & SVS
Hyundai Motor CO	London Stock Exchange	Corporate governance	Peugeot SA	MSCI EUROPE AUTOMOBILES
Electricite De France S.A.	Euronext Paris	Corporate governance	Enel S.P.A.	MSCI EUROPE UTILITIES
Bae Systems Plc	London Stock Exchange	Corporate governance	Thales S.A.	MSCI EUROPE AUTO COMPO
Morgan Crucible Co Plc	London Stock Exchange	Corporate governance	ATB Austria Antriebstechnik Aktiengesellschaft	MSCI EUROPE ELEC EQ
Deutsche Telekom Ag	Frankfurt Stock Exchange	Corporate governance	France Telecom S.A.	MSCI EUROPE T/CM SVS
Emi Group Ltd	London Stock Exchange	Corporate governance	Vivendi	MSCI EUROPE DIV FIN SVS
Safran	Euronext Paris	Corporate governance	Dassault Aviation S.A.	MSCI EUROPE AUTO COMPO
Bayer Ag	London Stock Exchange	Corporate governance	Novo Nordisk A/S	MSCI EUROPE PHARM
Dsg International Plc	London Stock Exchange	Corporate governance	Arcandor AG	MSCI EUROPE MEDIA
Groupe Danone Sa	Euronext Paris	Corporate governance	Parmalat S.p.A.	MSCI EUROPE FD PRD
European Aeronautic Defence & Space Co Eads Nv	Euronext Paris	Corporate governance	Zodiac Aerospace S.A.	MSCI EUROPE AUTO COMPO

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