Do investors penalize lack of prevention of ESG incidents?

by

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Preface

I want to express appreciation to my supervisor Hans K Hvide.

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Abstract

I examine market reaction on 1987 global ESG incidents over ten years, from 2010 to 2020. To evaluate if investor value negative ESG information consistently, independent on company traits, event study of mean cumulative abnormal returns is applied.
ESG incident do not cause market reaction. Investor values ESG incidents differently, depending on company traits. I find that investors value negative ESG information for companies that show lack in preventive measures on ESG incidents. Companies with lack of preventive measures experience a negative effect on abnormal returns and underperform compared to companies that show favorable traits.

I used STATA /SE for the empirical analysis.

Keywords: ESG, CSR, Stakeholder theory, Event study.

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1. Introduction

The purpose of capital markets is to efficiently allocate capital. From a sustainability perspective, the financial market can facilitate flow of capital towards sustainable projects, innovation and technological solutions that can contribute to economic growth, without compromising the needs of future generation. Investors valuation of ESG information is imperative to motivate environmental, social and governance considerations in companies' strategy and financial decisions.

Development of the ESG framework aim to identify relevant factors for environmental-, social, and governance recourses material for financial impact (Schoenmaker and Schramade, 2019). ESG is the initials for environmental, social and governance issues. The foundation for ESG issues is UNs plan for a sustainable future, Sustainable Development Goals (SDG). The SDGs describe seventeen overall objectives , designed to inspire both private and public organisations to take global action. Material ESG issues connect the companies' economic activities to the externalities they cause for society. This connection between a company financial and social considerations require an assessment of company's social responsibilities.

Contribution from capital markets towards sustainable economic development, depends on its ability to make use of information available on ESG issues in financial decisions. If investors value such information, price reactions in capital markets should be present. If the investors do not value ESG information consistently across companies, hench valuation depend on company traits.

In this thesis I will examine investor valuation of negative information regarding environmental, social and governance issues. If investors value information on ESG incidents, I expect to find market reactions in time intervals around publication date of such news. To explore the relationship between company characteristic and variation in abnormal return. I examine variation in abnormal return on subsamples, selected on company characteristics thought to impact their capabilities in relation to ESG risk and incident. I will be particularly interested in two types of company traits: one that demonstrates a strong performance in preventing ESG incidents, and the other that possesses the necessary characteristics for efficient risk management.

I will employ 1987 ESG incidents for global companies over ten years, from 2010 through 2019, to examine abnormal returns around the date of ESG incidents. I will employ an event study to examine variation in mean cumulative abnormal returns over five days around the incident. Additionally, I examine subsamples and test for difference in means between the groups before doing a cross-sectional study of cumulative abnormal return.

I find evidence that investors value negative ESG information when considering companies that show no characteristics aligned with performance in preventing ESG incidents. Furthermore, this effect strengthens compared to companies that do exhibit strong performance on preventing ESG incidents. These results hold true when considering the cross-sectional variation, this effect is not driven from risk management, which could imply that there is a cost related to failure to take action on ESG issues.

I present the theoretical background applied for interpretation of results before I review relevant literature in chapter 3. The overall objective with the thesis is depicted in chapter 4. Chapter 5 present a thorough review of the data, sampling procedures and descriptive statistics before describing estimation strategy and statistical model. Results are presented in chapter 6 and validity discussed in chapter 7. Finally, in chapter 8 I will summarize main findings and closing thoughts.

2. Theoretical background

2.1. Efficient markets

The outset for efficient market theory is price series that will develop as a random walk, where all successive price changes represent independent deviations from previous price (Malkiel, 1989)
Markets are efficient when security prices reflect all available information (Fama, 1970; Malkiel, 1989) Capital markets should contribute to effective resource allocation, if prices provide accurate signals, this will enable investors to allocate capital accordingly. Fama (1970) describe different sets of information content based on the efficient market hypothesis (EMH), which present proposed three degrees of market efficiency. To which extent the

market is efficient, is determined by investors realization of abnormal returns and the markets price reaction to new information. EMH describe the market ability to incorporate new information in current prices. According to Jensen (1978) this is the point where marginal benefit of acting on the information equals the marginal cost (Fama, 1991).

In its weakest form, prices will reflect historic price information only, the development in prices will follow a random walk. Best prediction of tomorrows price is the price today. In such markets it is not possible for investors to make consistently abnormal returns over time (Fama, 1991; Malkiel, 1989; Fama, 1970).
If all historic prices and relevant publicly available information is reflected in prices, the markets efficiency is semi-strong. New information will cause an immediate price reaction. Investors will not be able to generate abnormal returns from available financial statements, announcements or reports on analysis based on publicly available information The strongest form of EMH include all information know by market participant (Malkiel, 1989). All public and private information is reflected in current prices. Investor cannot gain abnormal returns on private information in such markets (Fama, 1991; Malkiel, 1989; Fama, 1970).
EMH in its semi-strong form is broadly accepted in the literature (Malkiel, 1989). Fama et. al., (1969) study announcements return for stock splits on New York Stock Exchange and find evidence in support for the semi-strong form of market efficiency. Prices adjust immediately and investors does not attain abnormal returns after the announcement.

2.2.Shareholder and stakeholder theory

Shareholder theory view the company as an entity for profit maximation. Social responsibility, in this perspective, would represent tending to stakeholder interest at the shareholders expenses. Friedman (1970) sited himself, concluding in his infamous article "*there is one and only one social responsibility of business – to use it resources and engage in activates design to increase its profits..”* Friedman emphasise corporate executives' conflict of interest if main objective should shift from maximising shareholder value toward taking other interest into account. Hart and Zingales (2017) conclude that Friedmans rationale can only be deemed just if one divides a company's *“profit-making activities and damage generating activities”.* Alternatively, it will require regulations to be in place, to internalize externalities from a company's economic activities.

CSR was described by Bowen (1953) as an expression of the company philanthropic behaviour, fundamental moral actions towards society. Bowen position the company in a stakeholder perspective where decisions made by the firm have implications not only for the firm itself but all stakeholders. He argues that corporate social responsibility is not an obligation, but voluntarily (Bowen et. al., 2013).

Stakeholder theory propose that all stakeholders should be considered when managers make economic decisions. Stakeholders are all individuals that can affect or be affected by the welfare of the company (Jensen, 2010) How such interest should be balanced is discussed in the literature. Jensen (2010) propose a refined shareholder value, enlightened stakeholder theory, which consider that good stakeholder relations can contribute to lower transaction cost (e.g., need for complex contracts) and boost business activities. Tending to stakeholders' interest is a mean to shareholder value maximation. Hart and Zingales (2017) propose maximizing shareholders welfare through prosocial shareholder voting. They argue maximation of shareholder welfare will contribute to internalise externalities. Shareholders prosocial voting on corporate policy is substantiated by the institutional investor, that in fact is just ordinary people which have financial, ethical, and social interest.

3. Literature review

There is a large and differentiated litterateur on sustainability and financial performance, many whom investigate the relationship between different quantitative measures and stock returns. Halbritter & Dorfleitner (2015) examine ESG rating and stock returns, they find no effect of different ESG rating and returns. Edmans (2011) study employee satisfaction and return. The study find that the stock market does not fully value the contribution from employee satisfaction to financial performance. Although not causal inference is draw from employee satisfaction on return, the study establishes a positive correlation (Edmans, 2011). Some issues regarding such studies is the endogeneity in sustainability rating.

Several studies considering corporate social responsibilities (CSR) and present relevant findings for this thesis, most studies are done on US companies.

Krüger (2014) examine publicly US listed companies and investor reaction to CSR news.

The study finds that investors react negatively to corporate social responsibility (CSR) information independent on information content being positive or negative. Negative investors reactions are more subtle for positive news. Positive CSR information for companies displaying poor stakeholder is valued by investors (Krüger, 2014). The study also finds stronger investor reaction for CSR information content relevant for legal and finical issues. The negative reaction to positive CSR information is explained by agency problems. Ferrell et al. (2016) do also raise the implication of agency cost for CSR performance Ferrell et al (2016). I have not emphasized this finding as I am examining negative ESG incidents only.

Lins and Tamayo (2017) also examine the US market. The study depict that CSR performers yield higher stock returns in during periods of high uncertainty Companies showing corporate social responsible performance obtain better financial performance in terms of profitability and growth. Companies investing in CSR experience an advantage when overall trust in market participants are low.

Hartzmark and Sussman (2019) study US mutual funds and examine investor valuation of sustainability and finds that sustainability have a positive effect on expectations of fund performance. The study provide evidence in support of investors valuing sustainability, sustainability is perceived as suitable to predict future performance. When comparing funds on sustainability, they find that sustainable fund does not show superior performance.

Deng et al. (2013) study company mergers in US and find a positive relationship between corporate social responsibility and announcement returns for acquiring companies. Acquirers CSR performance can positively impact merger performance, hench shareholder value. They also find positive long term stock returns, which imply market inefficiency, the market does not value the benefits of corporate social responsibility immediately.

Other studies look at motives for social responsible investing (SRI). Riedl and Smeets (2017) study social preference and social signalling. They examine the largest funds in Netherland and find that social responsible investors expect lower return on Social Responsible Investment funds. They evidence support that fact that investor value Social Responsibility; investors show social preferences and willingness to waiver financial performance in this regard.

Hong and Kaspersky (2009) examine the “cost” of SRI by studying “sin” stocks. They find that norm-restrictions on investment decisions impact stock prices and returns negatively. The Investors imposing social preference in investment decisions, obtain a finical cost by not holding such stocks, represented excess returns from holding such stocks. “Sin” stock show greater expected return than other comparable stock with no norm-restriction. They apply data from the US, Canadian and European markets.

4. Research question

I examine the overall market response for the full sample, on negative ESG information. Investor valuation of ESG information is interesting because it could reveal an information about preferences in investment decisions. To explore this, I use two sets of subsamples, this enables to differ between company characteristics, and test if investor valuation varies across company traits. Subsamples representing companies that show business conduct in line with risk prevention, zero RRI, and characteristics that show prerequisite to efficient risk management, trust.
Negative ESG information define the event, I will use mean cumulative abnormal returns to measure the effect of ESG incidents. ESG incidents is expected to have negative effect on abnormal returns, for the sample as a whole and independent of the companies` ability to prevent or efficient manage ESG risk.
I will test following hypothesis; negative ESG information have no effect on mean cumulative abnormal returns. Second, investors value negative ESG information consistently, independent on company traits.

In the second part of the analysis, I want to look closer at both sets of subsamples by conducting a cross-sectional analysis, I use cumulative abnormal return for a three-day event window and apply two independent multivariate regression models with different specifications. Difference in investors valuation of negative information across companies should imply that investor have preference for certain company traits. First, I examine the relationship between cumulative abnormal returns and companies that show business conduct in line with prevention of ESG incidents. Second, I study variation in cumulative abnormal

returns by looking at companies that is assumed to have prerequisite to efficient risk management.
I will examine hypotheses: company traits have no effect on a company cumulative abnormal return.

5. Data and descriptive statistics

I have a dataset which features four main sources of data; Standard & Poor`s *Compustat* database and *RepRisk* event and ESG data, collected through Wharton Research Data Service (WRDS) web interface. *Research returns data,* factors, and daily returns data was downloaded from K. R. French (2022) website at Dartmouth. Trust scores for countries in sample is collected from World Value Survey (WVS) database and Democracy Index (DI) is collected from the Economist Intelligence website. All dataset used is collected for the timeframe January 1sth through 31st of December 2019. The world economy was in recovery from the financial crisis and data is collected up until the global pandemic Covid-19. The period can be described by low interest rates and rise in both public and private global debt and decreasing yearly growth. Daily company prices, factors, returns, and event data is merged on date and international company identification number (ISIN). All market and event data have daily frequency and monthly ESG data from RepRisk is merged on event dates and ISIN. Annual financial controls are merged on the base of entity-identification; event-ISIN combination. Trust scores and Democracy Index (DI) is both merged on ISO country codes and annual date.

5.1. Event and ESG data

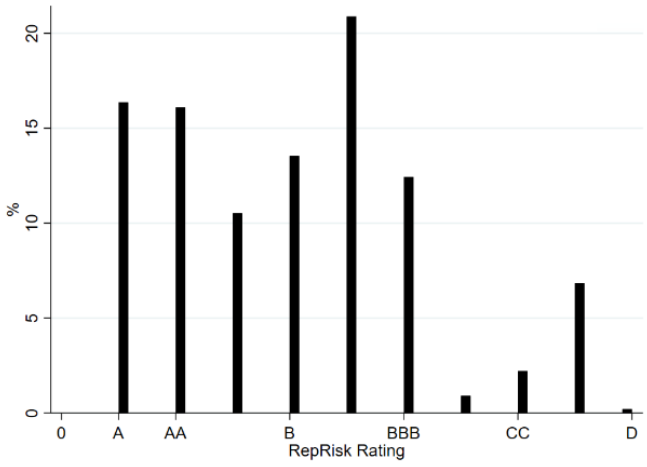
Sustainability data is collected from RepRisk, and provide a range of datapoints on material environmental, social and governance (ESG) risk factors. The data are event and issue driven, with the outset in 28 pre-defined ESG issues and ESG incidents. All issues are mutually exclusive and linked to international standards such as the UN Global Compact Principles, and the Sustainable Development Goals, amongst others. RepRisk approach is to collect data that can proxy for overall ESG relevant business risk exposure. They provide data on companies ESG business conduct by employing a risk perspective, focusing on information that have reputational, compliance and financial impact. When screening companies on ESG issues RepRisk use a combination of artificial intelligence, machine learning and human

intelligence. RepRisk intentionally exclude company self- disclosures, the data will in this regard avoid bias related information quality (RepRisk | RepRisk Methodology Overview, n.d.).

ESG issues data connect companies' environmental footprint, corporate governance issues, community- and employee interests, to ESG incidents. Risk incidents are recorded according to three parameters. Severity, reach and novelty. Severity depicts the extent of consequences from the incident and is includes as control in the analysis. Reach and novelty, describe the "newness" of an incident and reach is related to the reach of the source that reports the incident (RepRisk | RepRisk Methodology Overview, n.d.).

News data give a complete list of event dates, which is defined as when the ESG incident was publicly known. The data also link incidents and countries affected.
RepRisk Index data provide metrics relevant for ESG risk related business conduct. This dataset provide insight to a company reputational risk, overall ESG risk exposure and development in these parameters over time. RRI is updated if new incidents occurs and if earlier incidents continue to be an issue. This imply that if ESG incidents are manged the RRI will decrease over time. RR-rating enables peer comparisons and give a presentation of overall ESG risk exposure. ESG risk is adjusted so that low ratings only affect the extremely exposed, enables effective identification of such companies (RepRisk | RepRisk Methodology Overview, n.d.). Below the sample distribution of ESG risk profiles is presented by the RR-rating. The distribution is not sector or industry dependent, as the distribution depend on individual company RRI adjusted for country, sector-averages.

Figure 5.1: RR-rating distribution, full sample

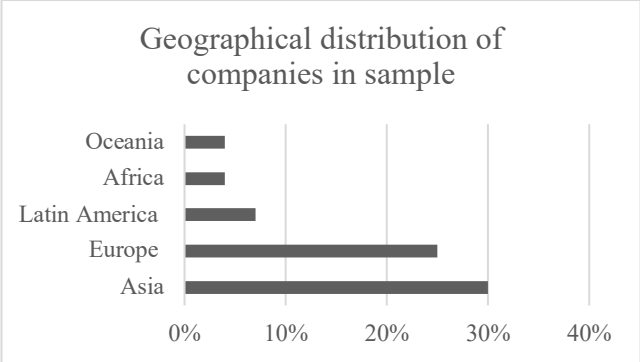


Note: The graph depicts RR-rating for all entities (company-event combination) in sample from 2010-2019. A-rating denotes low risk compared to other companies in the sector, D equivalent to high risk.

5.2. Company prices and financial data

Global market data from Compustat provide historic time series for public companies. The sample consist of company prices for 317 individual companies, located in 44 different countries. To calculate individual company returns and market capitalization, daily closing prices are adjusted for stock splits and dividends(Compustat Global, 2022). Global Industry classification codes is used to control for industry fixed effects in the cross-sectional analysis. There are companies representing 59 different industries in the sample.

Figure 5.2: Geographical distribution of companies in sample



Annual accounting data from Compustat is used to calculate financial controls for the cross-sectional analysis. Leverage and return on assets are constructed on accounting data one year prior to event date. Market capitalization controlling for individual company size, leverage for financial risk and capital structure and ROA for profitability.[1]

[1] Definitions and calculations of financial controls (Compustat), see appendix.

5.3. Return data.

E. F. Fama and K. R. French (1992) use time series regression on historic stock prices to show that three risk factors, market, size, and book-to-market (value) factors, predict common variation in stock returns. In an earlier paper, same year, they provided evidence that size and book to market factors are related to economic fundamentals, hence these factors proxy for common risk factors in returns. They constructed portfolios meant to mimic the risk factors for respectively size and value (Fama & French, 1992).

Small minus big, the SMB factor, aim to capture the effect of excess average return on small cap versus big cap companies (Fama & French, 1992). This is done by constructing a SMB portfolio, which is the difference in between value-weighted average returns on three small-cap and three big-cap portfolios. For global data this operation is done per region (French, 2022).

High minus low, the HML factor, captures the effect of excess average return on value versus growth companies (Fama & French, 1992). HML portfolio is constructed in a similar approach as the SMB portfolio (French, 2022).

The market factor is the excesses market return, the difference between return on a geographical areas value -weighted market portfolio and the US one month treasury bill rate. US one month treasury bill rate is also used as risk free rate for Global companies (French, 2022). The global benchmark, market factor, is the difference between the return on the value-weight portfolio for the different regions minus US T-bill rate.

I have also included the momentum factor (MOM) in the dataset, as this will capture variance in average stock returns due to prior stock performance, the momentum effect on company prices. In the paper by Jegadeesh & Titman (1993) it is emphasized that this effect is significant short term (3-12 months), they do not find evidence that substantiate momentum effect will persist long term. The momentum variable is in practical terms the difference between average return on two high prior return portfolios and two low return portfolios (French, 2022). Carhart (1997) paper which look at mutual fund performance, argues that inclusion of the momentum effect as describes by Jegadeesh & Titman (1993), is better able

to explain the average variation in returns. To predict expected returns, I will include the momentum variable in the statistical pricing model.

5.4. Data on general trust in population and democracy index.

Fukuyama (1995) define trust as a situation "*when a community shares a set of moral values in such way as to create expectation of regular and honest behavior*". The absence of trust requires a system of formal rules and regulation, a resource-intensive exercise, in this context trust can increase economic efficiency by reducing transaction cost and by extension promote cooperation in a society (Fukuyama, 1995). Inspired by La Porta et al. (1996) study on how trust can be a valuable factor for governance performance in large intuitions, I will use trust as a proxy for companies' ability to efficient prevent and manage ESG risk. Consideration of stakeholder's interest is key to ESG risk management. I propose that high general trust within the population will facilitate improved stakeholder relations, reducing the need for extensive contracts and regulations, resulting in lower transaction costs associated with all economic activity. I will examine investor valuation of companies argued to have favourable attribute for effective risk management.

World Value survey is an international research program that collect global data on social values every 5 years. I have retrieved data on trust from the surveys WVS2, 6 and 7. WV2 is a survey that runs from 1990 to 1994 and is included because some European countries were not a part of later surveys. Trust is measured on positive response to the question *"Generally speaking, would you say that most people can be trusted or that you need to be careful in dealing with other people?"* The variable for each WVS is denotes as the weighted mean of trust in the population. (World Values Survey Association, n.d.) The Democracy Index (DI) is based on indicators for electoral process and pluralism, functioning of government, political participation, political culture, and civil liberties. All countries are ranged from full democracies to authoritarian regimes depending on the DI-score. ("Democracy Index 2022. Frontline Democracy and The Battle for Ukraine," 2023/2023).

5.5. Variables and sample selection

5.5.1. Variables description

Explanatory variables

I use two explanatory variables in the statistical analysis, *trust* and *zero RRI*. I want to examine if reputational risk in the time leading up to the event have an impact on market reaction from a negative ESG incident. I create subsamples of companies that have no associated reputational risk in the time leading up to the ESG incident. Zero RRI companies exhibit a lack of news and stakeholder coverage both during the estimation window, the time leading up to-, and the time of ESG incident (news date). I argue that no reputational risk can be interpreted as a sign of an organisational culture that focus on preventing ESG incidents. As such companies should experience, at average, fewer ESG incidents over time hence obtain no interest from stakeholder or media on mismanaged ESG issues. I propose that no associated ESG risk over time can serve as a proxy for company traits of ESG performers.

Further I want to examine market reactions for companies operating in countries where general trust in others is high. I use *trust* as a proxy for efficient ESG risk management. The argument is that trust contributes to better cooperation skills and reduce transaction cost, hence could be an indication of companies that have traits in line with efficient risk management. The trust indicator value can classify companies located in countries, where the general trust level in the population exceeds the median adjusted trust score. All companies are sorted accordingly and countries in each subsample is listed below.

Table 5.1: Countries allocated in respect to adjusted trust score.

Above median countries	Below median countries
Australia	Austria
Denmark	Bangladesh
Finland	Brazil
Germany	Bulgaria
Great Britain	Chile
Hong Kong	Colombia
Iceland	Egypt
Ireland	France
Italy	Indonesia
Japan	Jordan
Macau SAR	Malaysia
Netherlands	Mexico
New Zealand	Nigeria
Norway	Pakistan
Sweden	Peru
Switzerland	Philippines
	Poland
	Portugal
	Russia
	Singapore
	South Africa
	South Korea
	Spain
	Taiwan
	Thailand
	Turkey
	Ukraine
	Vietnam

Note: The full sample is assigned in respect to the adjusted trust score, the weighted average between trust rate from the World Value Survey (WVS) and the Democracy Index (DI). The trust indicator variable used is equal to 1 if trust index is above the median of weighted trust index, otherwise equal to 0

Adjusted trust scores are created because the data on trust scores is collected from different time periods, for different countries. To mitigate this, I have included the democracy index for all countries for the period 2010 to 2019. By doing this adjustment to raw trust score I aim to account for significant changes regarding development in political governance in some countries in the sample. E.g., in the raw trust variable, the replies to question of trust in others, is not mitigated by the changes in of freedom of speech. Mean democracy score for the period 2010 to 2019 and mean trust score for WVS2, 6, and 7 is applied to adjusted trust score.

Table 5.2: Adjusted trust score

Table: Adjusted trust score

Country:	Mean trust score	Mean democracy score	Adjusted trust score*
Australia	50,0	9,1	29,5
Austria	31,8	8,5	20,1
Bangladesh	12,9	5,8	9,3
Brazil	6,8	7,0	6,9
Bulgaria	30,4	6,9	18,7
Chile	12,7	7,8	10,2
Colombia	4,3	6,7	5,5
Denmark	57,7	9,3	33,5
Egypt	14,4	3,4	8,9
Finland	62,7	9,1	35,9
France	22,8	7,9	15,3
Germany	44,6	8,5	26,6
Great Britain	45,4	8,3	26,9
Hong Kong SAR	42,2	6,3	24,2
Iceland	43,6	9,6	26,6
Indonesia	4,6	6,7	5,6
Ireland	47,4	8,9	28,1
Italy	35,3	7,8	21,6
Japan	34,8	8,0	21,4
Jordan	14,6	3,8	9,2
Macau SAR	41,4	3,0	22,2
Malaysia	14,1	6,5	10,3
Mexico	11,5	6,6	9,0
Netherlands	60,8	8,9	34,8
New Zealand	56,0	9,3	32,6
Nigeria	14,0	4,1	9,0
Norway	65,1	9,9	37,5
Pakistan	22,8	4,4	13,6
Peru	6,3	6,5	6,4
Philippines	4,3	6,6	5,4
Poland	22,2	7,0	14,6
Portugal	21,7	7,8	14,7
Russia	25,4	3,5	14,4
Singapore	35,9	6,1	21,0
Vietnam	27,7	3,2	15,4
South Africa	23,3	7,6	15,4
South Korea	29,7	8,1	18,9
Spain	19,0	8,1	13,6
Sweden	60,1	9,5	34,8
Switzerland	42,6	9,1	25,9
Taiwan ROC	30,6	7,7	19,1
Thailand	30,5	5,7	18,1
Turkey	12,8	5,1	9,0
Ukraine	26,6	5,9	16,2

Note: *Weighted averages of trust and democracy scores
Countries are matched on ISO country code country. The full sample is assigned in respect to the overall trust score and democracy index score. A weighted average includes trust rate form the World Value Survey (WVS) and the Democracy Index (DI). WVS have datapoints from different surveys depending on county, mainly from 2010 to 2021. Data on missing European countries from earlier surveys (1990-1994) are used where more resent data was not available. DI have full set of data for the period. Full tables for WVS and DI in appendix.

Control variable included is the individual company ESG characteristics, severe incidents and the level of attention from stakeholders and media. Where the incident occurs, if ESG incident is linked to a company's economic activity in home country or if the incident has international

impact. Controls variables for financial risk, the size of the company and profitability[2] is also included.

5.5.2. Samples selection and descriptive statistics

The sample was randomly drawn from the Compustat database, all companies equally drawn from small-, mid- and big market capitalisation using Stata function resampling[3]. The sample consist of 3945 global companies after matching with the RepRisk database. RepRisk news data provide exact publication date on ESG incidents. The dataset contains multiple ESG incidents on the same date and there are several events per company. One incident can be recorded several times if it is implied changes in ESG risk for one individual company, or if the incident gets more severe over time. Also, several companies can be involved in the same incident. Correcting news data for confounding events, selection of ESG incident per news date is done first on "newness" per company and news id. I keep incidents that have no earlier records, to ensure events that features unexpected information. For incident that still occur on same date I select news on severity. For the last sorting I keep incident with farthest reach. Merging news data to Compustat data, all event-combination that have enough trading days, starting 142 days before the event, ending 2 days after, is continued. Final sample consist of 1987 company-event combinations, for total 317 companies over the period January 1, 2010, to December 31, 2019. I have removed all events after 2019 due to the pandemic.

Figure 5.3: Distribution of ESG issues for all incidents

[2] Se full table for description of all variables in the appendix
[3] Selection on company market capitalization is done after classification big- mid- and small cap, in USD.

The sample contain a preponderance of environmental incidents. Table 5.3 presents summary statistic[4] and test of means between the subsamples companies associated with-, or those who have no reputational risk, as well as companies located in countries with general trust in population above and below the median.

Table 5.3: Summary statistics for key variables

	Sample zero RRI status	Sample RRI status	T-test of difference in means	Sample above median trust	Sample below median trust	T-test of difference in means
	(A)	(B)	(A-B)	(C)	(D)	(C-D)
Variables:	Mean	Mean	Mean	Mean	Mean	Mean
RRI status	0	17.698	17.698***	6.567	5.468	-1.099 ***
ESG risk trend	-0.019	0.010	0.029 **	0.032	-0.061	-0.093 ***
RR-rating	3.516	4.952	1.436***	4.020	3.997	-0.023***
Country/sector risk	38.512	40.912	2.399***	39.255	39.442	0.187***
High severity	0.0498	0.042	-0,007***	0.041	0.054	0.013***
National/regional reach	0.153	0.134	-0.018***	0.146	0.147	0.001
International reach	0.271	0.281	0 .010***	0.347	0.182	-0.165***
Country of incident	0.393	0.433	0.041***	0.202	0.667	0.466***
Adjusted trust score	20.286	21.340	1.056***	26.404	13.333	-13.070***
Leverage	0.415	0.404	-0.011***	0.413	0.409	-0.004*
Market capitalisation	25.408	25.530	0.123***	24.782	26.298	1.516***
ROA	0.003	0.0514	0.0486***	0.022	0.0161	-0.006***

Note: The table show the test of means, on key variables, for subsamples.

Companies no reputational risk (zero RRI) show on average negative short-term risk trend compared to companies associated with reputational risk, which could suggest a stronger focus on risk management. Zero RRI companies also have significant higher RR-rating and lower profitability (ROA) than the comparing group. There is a significant higher country-sector risk for those companies with reputational ESG risk. Mean general trust level is significantly lower for companies with no reputational ESG risk.

Summery statistic for subsamples allocated on median level of general trust show that companies in high trust countries have lower RR-rating and significantly higher reputational risk, which might suggest some differences in industry groups between such companies. Companies from low trust countries have on average significant negative short term risk trend, and significantly lower profitability. For companies located in below median trust

[4] Table: Summary statistic full sample, appendix

countries, the majority of incidents occur in “home” country. This is in contrast to companies located in high trust countries, where a preponderance of ESG incidents happens abroad.

5.6. Event study

The research on event studies is mature and is a frequently used in empirical finance, as it is a useful to examine possible impact on company prices due to new information (Brown & Warner, 1980). There is several of methodological overviews of the event study presented in the literature (Binder, 1998: Bowman, 1983: Brown & Warner, 1980, 1985: Corrado, 2011), for this analysis I will mainly rely on the method as presented by MacKinlay (1997)

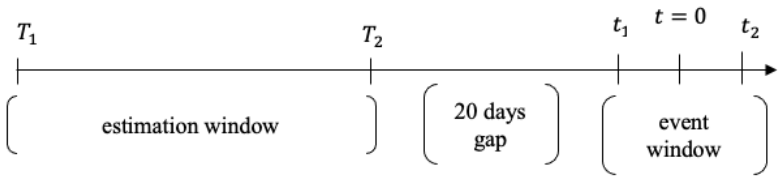
The outset is the theoretical foundation of capital markets, they are efficient and unbiased when pricing new information. *“The market will adjust asset prices to that information quickly and without leaving any opportunity for further abnormal gain.”* (Ball and Brown, 1968) Fama et all. (1969) find that new information is reflected in market prices immediately after announcement. Hillmer and Yu (1979) examine the market speed of adjustment, they emphasize two factors. New information needs to be relevant for potential economic gains, and the information need to be relevant for a company cash-flow.

Some assumptions are necessary. Information that is publicly known, including all information on past prices, is reflected in the current price. The event represents information that can affect expected valuation of companies. The information should be unexpected. Last, there are no confounding effects present in the event window, which mean no other factors that can impact abnormal returns and time of ESG incident.

The event is defined by ESG risk incidents, transgression on predefined ESG issues exist (e.g., violation of international sustainability standards or national legislation, supply chain or product issues, controversial product, or services). RepRisk daily screening for ESG incidents implies that the timing of events is reasonably precise. Timing of the event, marked by the point in time where the ESG risk incident is known in the overall market. News dates are selected on “newness”, the first date when news of the ESG incident was publicly available, as advised in Fama et al. (1969).

I will in use the approach as shown in MacKinlay (1997). The estimation window is set to 120 trading days, ending 20 days before event window, to ensure that no information relating to the ESG incidents would impact the estimation period. The event window includes 5 trading days and event at $t = 0$. The timeline for the event study is illustrated below, a timeseries per entity for 145 trading days from T_1 through t_2.

Figure 5.4: Timeline for the eventstudy



The length of event and estimation window is a trade-off between precise results, and risk of interference from confounding events. Estimation window is decided on 120 days after assessing available data after controlling the sample for confounding events. Event window over 5 days around event, enabling study of different time-intervals around the event date. Normal performance for the estimation window is used to obtain abnormal return for the event window.

5.6.1. Estimation of abnormal return

Abnormal returns for company(i) at time period (t) are defined as the difference between actual return $(R_{i,t})$ and expected return $E(R_{i,t}|X_t)$. Time is denoted as $t = 0$ at event date. X_t is the conditioning information for expected returns (MacKinlay, 1997). I will use statistical model as shown by Fama and French (1992). The three-factor model with an addition of the factor for momentum effect on returns (Carhart, 1997: Jegadeesh & Titman, 1993). I use this statistical model to estimated normal return. Expected returns on company will consequently be adjusted for the four factors, return on the market, size, value, and the momentum effect.

The formal presentation of abnormal returns as in MacKinlay (1997)

$$AR_{i,t} = R_{i,t} - E\left(R_{i,t}\middle|X_t\right) \qquad (1)$$

Abnormal returns measure company (i) market and risk adjusted performance, hence measure unexpected return (Brown and Warner, 1980). Abnormal return for each company reflects company specific news only.

Mean abnormal return AAR in sample, at time t for N companies, eliminate idiosyncrasies due to individual companies by aggregating mean abnormal returns for all companies.

$$AAR_t = \frac{1}{N}\sum_{t=1}^{N} AR_{i,t} \qquad (2)$$

I need the aggregated measure of abnormal return, over time and observations, to be able to draw overall inference of an ESG incident. The representation of these measures, CAR and $CAAR$, as presented by MacKinlay (1997). If ESG incidents influence abnormal returns it is necessary to have a measure of performance over time, the event window. Cumulative abnormal return (CAR) measures the impact of an ESG incidents over the time period, for company(i), it starts at time t_1 through t_2

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t} \qquad (3)$$

The effect of ESG incidents across all observation can be summarized with the cumulative *average* residual method. I use this measure to examine the market price reaction to ESG incidents. If prices adjust immediately, the market price in new information on negative ESG news, which would indicate semi-strong market efficiency. Cumulative mean abnormal returns $CAAR$ is formally described as aggregated mean abnormal return from t_1 through t_2

$$CAAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AAR_t \qquad (4)$$

This measure requires no overlapping event windows for all companies, to ensure independent observations across companies.

Test statistics for cumulative mean abnormal return can be obtained for the event window, t_1 through t_2 as presented by Brown and Warner (1985).

$$T = \frac{CAAR(t_1,t_2)}{\sqrt{\sum_{t=t_1}^{t_2} \widehat{S^2}(AAR_t)}} \qquad (5)$$

The ratio of CAAR, for desired number of days in the event window, divided by its estimated standard deviation.

5.6.2. Estimation of normal returns

I need a benchmark to obtain abnormal returns, a model that captures variation in expected stock returns $E(R_{i,t}|X_t)$, driven by other circumstances than ESG incidents. I have chosen to use statistical model to estimate normal returns, the three-factor model with an addition of the momentum factor (Fama & French, 1992: Carhart, 1997). The model assumes a linear relationship between the return on the market, the risk factors size, value and momentum and the expected return on the security. Normal returns for company (i), at time (t) can formally be expressed as:

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_{i,1}(R_m - R_{F,t}) - \beta_{i,2}R_{SMB} - \beta_{i,3}R_{HML} - \beta_{i,4}R_{MOM} - \varepsilon_{i,t} \qquad (6)$$

Normal returns are depicted by its responsiveness to the return on the market portfolio (R_m) and the three risk factors $(R_{SMB}, R_{HML}R_{MOM})$. To estimate normal returns, I use ordinary least square (OLS) regression to obtain the OLS estimators. Abnormal returns for company (i), at time (t), is given by the difference of return $R_{i,t}$ and normal return.

The benefit of using factor model for estimation of normal return, is the possible reduction of variance in abnormal returns by explaining more of the variance in normal returns (MacKinlay, 1997). The choice of model for normal returns affects the properties for the measure of abnormal returns and the model with the strongest explanatory power should be applied. MacKinlay (1997) point to the limited gain from using factor model compared to adjusting normal returns for systematics market risk. Carhart (1997) argues that the factor model explains sizable variation in normal returns and that the average pricing anomality is lower when including the momentum effect in the factor model.

5.7. Statistical model

5.7.1. Ordinary Least square (OLS) regression

OLS regression describes the linear relationship between one or more explanatory variables on an outcome variable. By estimating the coefficients that minimize the sum of squared mistakes, the OLS estimators are obtained. The relationship can be formally presented by the regression equation.

$$Y_{i,t} = \beta_0 + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \mu_{i,t} \qquad (7)$$

The observable dependent outcome variable Y and independent explanatory variables X, denoted for unit i at time t. The unobservable residual represented in $\mu_{i,t}$. We can now express the minimizing problem, for which we solve, to obtain the OLS estimators (β_k)

$$\min \sum {\mu_{i,t}}^2 = \sum_{i=1}^{N} (Y_i - (\beta_0 + \beta_1 X_{i1} + \cdots + \beta_k X_{ik}))^2 \qquad (8)$$

The assumption for the OLS implies that there is no covariation between the explanatory variables and the residual, extreme values are unlikely. and $Y_{i,t}$and $X_{i,t}$ is independently and identically distributed (Stock & Watson, 2015). Due to the structure of the data, some additional measures are necessary to give the OLS estimator a causal interpretation. Relevant issues in relation to sampling and standard error will be discussed below.

5.7.2. Fixed effect model

For the cross-sectional analysis of average abnormal return, I will employ the fixed effect model and utilize the variation across industries. The choice of model is substantiated on the assumption for the alternative random effects model is not likely to hold. It is not imposed that unobservable characteristics captured by a_i and explanatory variables $X_{i,t}^{`}$ included in the model are uncorrelated (Verbeek, 2017).

In a dataset with n industries of companies (i) over the time period T, companies may have characteristics that are common but differ across industries, unobserved or fixed effects. To interpret differences in average abnormal returns as causal, I need to manage other factors that

can impact abnormal returns than the event itself. To account for company (i) specific characteristic I will include fixed effect, to eliminate unobserved effects that is constant over time $(t = 1.., T)$ (Verbeek, 2017)

$$Y_{i,t} = X_{i,t}^{`}\beta + a_i + u_{i,t} \qquad (9)$$

The formalization in equation postulates the relationship between the outcome variable $Y_{i,t}$ and explanatory variables denoted in vector $X_{i,t}^{`}$. $u_{i,t}$ is assumed to be homoscedastic and not correlated over time. Unobserved effects for company specific characteristics are denoted a_i in the model and is time invariant and homoscedastic. As the data consist of observations of variables over time, it is reasonable to assume autocorrelation in the residual term. This can produce autocorrelated regression errors. The implication is that serial correlation in the residual term should be captured by a_i and there for possible to obtain efficient OLS estimators (Verbeek, 2017).

Given the assumptions for the OLS estimator, the sampling distribution of the fixed effect estimators is normal in large samples. Residuals are clustered at industry level. Allowing the standard errors to correlate within industries, but assumed to be uncorrelated across clusters, enabling treating standard errors as uncorrelated across industries.

6. Results

In the first part of the analysis, the event study method is applied to test the hypothesis, ESG incident have no effect on CAAR, across all companies. To examine the market reaction during the event window covering the ESG incident, one day before and on day after and last a five-day event window. Subsequently I examine two set of subsamples to study if there are any differences price reactions from ESG incidents between the groups. In the cross-sectional analysis, I use a multivariate fixed regression model to examine if ESG incident is perceived differently in the market on basis of company traits. Such trait for the first group is companies with no associated reputational risk over the estimation and event window, compared to those

companies that do. General country level of trust is used as an indication for companies that have prerequisites for efficient ESG risk management.

6.1. Market reaction from ESG incidents

I examine the effect of ESG incident on mean cumulative abnormal returns over a five-day event window. The factor-model is applied to adjust expected return and estimate abnormal returns for each entity. An estimation window of 120 trading days is applied, ending 20 days before event window. Different time intervals over the event window are considered, respectively five days, three- days and event date. The event date is the day ESG incident was publicly known for all market participants. The full sample represent 317 global companies and 1987 ESG incident over 10 years, 2010 through 2019.

6.1.1. Market reaction, full sample

I test the following hypothesis: negative ESG information have no effect on mean cumulative abnormal returns.

Table 6.1: Cumulative mean abnormal return, full sample

	Full sample *N=1987*	
	Mean	*P-value*
CAAR (0)	0,0115	*0.769*
CAAR (-1,1)	0,0041	*0.867*
CAAR (-2,2)	-0,0084	*0.696*

Note: The table show cumulative mean abnormal returns in percent, for all company-event combinations in the sample. CAAR for five days, three days and at the event date are depicted for the full sample. CAARs are estimated with robust standard error. Significant t-statistics denoted according to corresponding p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Mean cumulative abnormal returns are aggregated for all entities (company-event combination) in the sample. I find no significant effect on CAAR when considering the day of ESG incident, three-day or for the five-day event window. I expected that mean cumulative

abnormal return would decrease for all time intervals in the event window. As presented in the table below, a decrease in CAAR does not occur before assessing CAAR two days before through two days after.

I find no significant effect on mean cumulative abnormal return from ESG incidents. Possible explanations could be that investors value such information differently for various companies, or asses the information irrelevant to underlying cashflows. I have examined the event days individually, for different intervals, before and after the ESG incident, there is no significant effect on CAAR for neither options. Negative ESG information does not cause market reaction over the event window.

6.1.2. Market reaction for subsamples distributed on zero RRI.

I will test the following hypothesis: ESG incident have no effect on cumulative mean abnormal returns for subsamples distributed on business conduct in line with risk prevention, zero RRI. Investors value negative ESG information consistently, independent on company traits.

In table 6.2 the effect on CAAR for all time intervals and for each subsample is presented, before I test the differences in means between the two. I will use variable specification *zero RRI* companies in the proceedings, for all companies in subsample with no associated reputational risk. RRI status for those companies associated to reputational ESG risk. The rationale behind this distribution of subsample is discussed in 5.5.1.

Table 6.2: Cumulative average abnormal returns (CAARs) for zero RRI and RRI status companies for intervals in the event window

	A: Sample zero RRI status N=1304		*B: Sample RRI status N=683*		*A-B: T-test of difference in means*	
	Mean	*P-value*	Mean	*P-value*	Mean	*P-Value*
CAAR (0)	0,0346	*0,486*	-0,0327	*0,602*	-0,0674	*0,3997*
CAAR (-1,1)	0,0320	*0,293*	-0,0492	*0,224*	-0,0811	*0,1089*
CAAR (-2,2)	0,0254	*0,335*	-0,0727**	*0,047*	-0,0981**	*0,0296*

Note: The table show cumulative mean abnormal returns in percent, for all company-event combinations in the sample. ESG reputational risk is represented by the company's RRI level, which is used to allocate companies into subsamples. Indicator variable equal to 1 includes companies with no reputational risk at the time of the event, equal to 0 otherwise. CAAR for five days, three days and at the event date are depicted for full sample and subsamples. CAARs are estimated with robust standard error. Significant t-statistics denoted according to corresponding p-values $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

As depicted in the first column, there is no significant effect on mean cumulative abnormal returns for zero RRI companies. For RRI status companies I find significant negative effect on CAAR, on a 5 percent level, for companies associated with reputational ESG risk. This effect on CAAR is significant considering five days event window, this effect is not significant for smaller event windows. I test differences in means between the subsamples, for the day of incident, three and five-day event window. For smaller timeframe there is no significant difference in CAAR for the two subsamples. But at CAAR (-2,2), there is a significant difference between mean cumulative abnormal returns for zero RRI companies and companies associated to reputational ESG. This significant effect is due to RRI status companies negative market reaction to SG incidents. The effect of CAAR decrease when considering the difference to zero RRI companies. Overall, market reaction for RRI status companies is larger than for Zero RRI companies.

The results indicate that investor value information differently for the two subsamples. Companies associated with ESG risk at the time negative news is publicly known, experience a decrease in CAAR over five-day event window. This effect on CAAR is not present when

examine any other days or intervals in the event window. For an immediate market response, information should be unexpected by market participant. If investors expect such companies to experience ESG incidents, the effect should be present when considering pre-event time intervals. It could be a contributing factor that the scope of such incident takes some time to clarify.

I will argue that the outcome is in line with the expectation from the stakeholder perspective. ESG incident realizes a decrease mean cumulative abnormal returns for companies associated with reputational ESG risk. Under the assumption that companies not associated to reputational ESG risk features traits in line with focus on prevention of ESG incident. Hence, they should be better prepared to manage such incident when they occur. Companies that have associated reputational ESG risk at the time of an ESG incident is likely to be less prepared and therefore lack skills to manage incidents efficiently. These companies are expected to experience a negative effect on mean cumulative abnormal returns and the effect would strengthen compared to zero RRI companies.
The outcome is in line with the expectation from the stakeholder perspective. ESG incident realizes a decrease mean cumulative abnormal returns for companies associated with reputational ESG risk.

6.1.3. Market reaction for subsample distributed on trust.

I test the hypothesis: ESG incident have no effect on cumulative mean abnormal returns for companies that is distributed after companies` ability for efficient manage ESG risk. Investors value negative ESG information consistently and independent on company traits.

I will use variable specification *trust* companies in the proceedings, for all companies located in countries with adjusted trust score above median. Low trust for companies located in countries with adjusted trust score below median. The rationale behind this distribution of subsample is discussed in 5.5.1.

Table 6.3: Cumulative average abnormal returns (CAARs) for companies located above and below the median on the adjusted trust score.

	A: Sample above median on the adjusted trust score		*B: Sample below the median on the adjusted trust score*		*A-B: T-test of difference in means*	
	N=1113		*N=874*			
	Mean	*P-value*	Mean	*P-value*	Mean	*P-Value*
CAAR (0)	0,0163	*0,713*	0,005	*0,938*	-0,011	*0,894*
CAAR (-1,1)	0,0126	*0,653*	-0,007	*0,872*	-0,019	*0,702*
CAAR (-2,2)	0,0066	*0,793*	-0,027	*0,452*	-0,034	*0,443*

Note: The table show mean cumulative abnormal returns in percent, for all entities in the sample. Subsamples represent companies that are allocated according to their overall level of trust in population, above and below the median of adjusted trust score. CAAR for five days, three days and at the event date are depicted for full sample and subsamples. CAARs are estimated with robust standard error. Significant t-statistics denoted according to corresponding p-values $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 6.3 portray CAARs for trust and low trust companies. The results show no significant market reaction from ESG incident for neither subsample. Although, low trust companies show negative effect on CAAR for three and five-day event window. Considering the differences between trust and low trust sample, strengthening of negative effects was expected. Though, there is no significant difference in CAARs between the samples for neither days or intervals in the event window.

An implication for examining price reaction for these subsamples, could be the fact that most accident does not happen in “home” country for companies located in above median trust countries. There could be a difference in investors perception of information on ESG incidents, depending on whether the ESG incident is related to economic activities in “home” country or “abroad”. Also, if ESG incidents in low trust countries is not perceived as unexpected from investors, a market reaction would not be present when considering the event window.

ESG incident is expected to yield negative effect on mean cumulative return, regardless of which country the company operates in. According to the stakeholder perspective the effect on CAAR for companies located in trust countries, is expected to be lower. Cooperation skills and better stakeholder relation should give these companies better premises for efficient risk management. Lower transaction cost in relation to mitigation of incidents should also curb negative effect on CAAR. From a shareholder perspective, good stakeholder relations could represent additional cost for a company. In this perspective companies located above median trust countries is expected to incur higher cost, at shareholders expense, affect cash flow negatively hench cause greater effect on CAAR.
It is not possible draw any inference from the result for companies in the subsample, as neither yield any significant effect CAAR from ESG incident.

6.2. Cross-sectional analysis.

In this chapter I examine cross sectional variation in cumulative abnormal return over a three-day event window. Testing the model for a larger event window did not change the result, a smaller event window is preferred. I use a multivariate regression model to examine if company traits, zero RRI and above median trust effect on cumulative abnormal returns. Five different model specifications are applied, the sample consisting of 1987 entities from 2010 through 2019. The model controls for unobserved industry fixed effects, using global industry classification standard (GIC-codes), 59 industries are represented in the sample. Standard errors are adjusted for heteroscedasticity and clustered at industry level. Part one show results for zero RRI companies, the second part show the result for companies located in countries above median adjusted trust scores.

6.2.1. Cumulative abnormal returns for subsamples distributed on zero RRI

For the cross-sectional analysis of zero RRI effect on cumulative abnormal returns ordinary least square (OLS) estimates, is depicted in table 6.4.
I will examine hypotheses: companies` ability to prevent ESG risk have no effect on a cumulative abnormal return.

The dependent variable is cumulative abnormal return for a three-day event window around the ESG incident. I want to examine if there is a significant difference between companies` that show ability to prevent ESG risk and companies` not showing the similar traits. Companies defined as zero RRI are not associated with any reputational ESG risk during the estimation period, the 20-day gap, or the event window. The explanatory variable takes value equal to one if zero RRI company, otherwise equals to zero. Zero RRI expresses the difference between the two subsamples. Variables for ESG, incidents and company characteristics are included.

Table 6.4: Cumulative abnormal returns, for companies with zero RRI.

	CAR[-1,1]				
	(1)	(2)	(3)	(4)	(5)
Zero RRI	0.270*	0.270*	0.305*	0.309*	0.314**
	(0.144)	(0.144)	(0.156)	(0.156)	(0.154)
ESG characteristics:					
ESG risk trend		-0.0292	-0.0294	-0.0305	-0.0303
		(0.0278)	(0.0276)	(0.0279)	(0.0275)
RR-rating			0.0279	0.0277	0.0288
			(0.0475)	(0.0486)	(0.0488)
Country/sector risk			-0.00190	-0.00270	-0.00287
			(0.00533)	(0.00542)	(0.00573)
Incident characteristics:					
High severity				-1.023***	-1.024***
				(0.438)	(0.444)
National/regional reach				-0.187	-0.186
				(0.189)	(0.186)
International reach				-0.193	-0.201
				(0.242)	(0.254)
Country of incident					-0.0407
					(0.147)
Adjusted trust score					0.0133
					(0.0130)
Company characteristics:					
Leverage	-0.000191	-0.000188	-0.000191*	-0.000186	-0.000167
	(0.000117)	(0.000116)	(0.000112)	(0.000122)	(0.000136)
Market capitalisation	0.0490**	0.0479**	0.0485**	0.0472**	0.0506**
	(0.0228)	(0.0219)	(0.0226)	(0.0226)	(0.0245)
ROA	0.0725	0.0689	0.0690	0.0592	0.0490
	(0.101)	(0.103)	(0.106)	(0.102)	(0.101)
Constant	-1.429**	-1.402**	-1.477**	-1.202*	-1.581**
	(0.607)	(0.590)	(0.584)	(0.604)	(0.698)
Industry fixed effects	yes	yes	yes	yes	yes
Sample	1987	1987	1987	1987	1987
Adjusted R^2	0.001	0.002	0.001	0.004	0.004

Note: Adjusted standard errors for heteroskedasticity (parentheses), clustered at industry level using GICS (Global Industry Classification Standard). Significant t-statistics denoted according to corresponding p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample consist of 1987 company-event entities from 2010 through 2019. Dependent variable is cumulative abnormal return for the three-day event window. Explanatory variable is the indicator variable *Zero RRI*, equal to 1 if company is not associated with reputational ESG risk (RRI) at the time of event date, otherwise 0. Controls for ESG, incident/event and company characteristics are included.

In the first regression including indicator for zero RRI and controls for company characteristics yield significant estimate for zero RRI companies. Companies with abilities to prevent ESG risk obtain at average higher cumulative abnormal returns than compared group. Zero RRI companies experience 0.27 percent change in CAR(-1,1) and coefficient is significant on 10 percent level. Controls for financial risk (leverage) and financial performance (ROA) yield no significant effects. Variable for size, market capitalisation, is significant at 5 percent level and have a positive effect on CAR (-1,1), as expected. Adding a control for short term ESG risk trend did not change the coefficient estimates significantly. Including benchmark against peers, RR-rating, and country/sector average in column (3) increase the effect of zero IRR companies. Negative effect of leverage is also significant and have a small negative effect on CAR, this effect ceases when including incident characteristic.

Incident characteristics are included in column (4) as expected, sever incidents have significant effect on cumulative abnormal returns. Severe ESG incident cause 1.023 percent reduction in cumulative abnormal returns, significant at 1 percent level. How information on ESG incident is distributed to the public is measured by the reach of the news source reporting the incident. Inclusion of these controls strengthens the Zero RRI effect slightly.

In the last column, variables for adjusted trust score and country of incident are added. Country of incident measures average effect of incidents happening in the same countries as the company headquarters are located. Inclusion of these controls strengthen the positive effect on zero RRI on cumulative abnormal returns, the coefficient is significant at 5 percent level. Effect of sever incident and company size are still significant and without major changes.

6.2.2. Cumulative abnormal returns for subsample distributed on trust.

Table 6.5 present the cross-sectional analysis of companies that have prerequisites for efficient ESG risk management effect on cumulative abnormal returns. I will examine hypotheses: companies` ability for efficient ESG risk management, have no effect on a cumulative abnormal return.

Indicator variable trust is used as key explanatory variable, representing the sample of companies located in countries with adjusted trust cores above the median. The trust variable measures the difference between the two subsamples. Dependent variable is cumulative abnormal returns for three-day event window. Controls for ESG, incidents and company characteristics are included.

Table 6.5: Cumulative abnormal returns, for companies located in countries with above median of adjusted trust scores.

	CAR[-1,1]				
	(1)	(2)	(3)	(4)	(5)
Trust	0.308	0.301	0.298	0.294	0.331
	(0.229)	(0.227)	(0.230)	(0.241)	(0.235)
ESG characteristics:					
RRI status		-0.00709	-0.00815	-0.00808	-0.00827
		(0.00616)	(0.00690)	(0.00665)	(0.00651)
ESG risk trend		-0.0251	-0.0247	-0.0258	-0.0261
		(0.0274)	(0.0272)	(0.0276)	(0.0275)
RR-rating			0.0171	0.0166	0.000168
			(0.0485)	(0.0497)	(0.0491)
Country/sector risk			-0.00138	-0.00215	-0.00215
			(0.00562)	(0.00559)	(0.00568)
Incident characteristics:					
High severity				-1.010**	-0.994**
				(0.443)	(0.448)
National/regional reach				-0.180	-0.184
				(0.188)	(0.185)
International reach				-0.211	-0.207
				(0.255)	(0.256)
Country of incident					0.0792
					(0.115)
Company characteristics:					
Leverage	-0.00016	-0.00016	-0.00016	-0.00015	-0.00016
	(0.00013)	(0.00014)	(0.00013)	(0.00014)	(0.00014)
Market capitalisation	0.0655**	0.0633**	0.0636**	0.0617**	0.0616**
	(0.0296)	(0.02279)	(0.0289)	(0.0279)	(0.0281)
ROA	0.0925	0.0908	0.0913	0.0797	0.0755
	(0.108)	(0.111)	(0.115)	(0.114)	(0.115)
Constant	-1.846**	-1.742**	-1.176**	-1.464**	-1.512**
	(0.831)	(0.778)	(0.775)	(0.700)	(0.687)
Industry fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
Sample	*1987*	*1987*	*1987*	*1987*	*1987*
Adjusted R^2	*0.001*	*0.002*	*0.001*	*0.003*	*0.003*

Note: Adjusted standard errors for heteroskedasticity (parentheses), clustered at industry level using GICS (Global Industry Classification Standard). Significant t-statistics denoted according to corresponding p-values * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Sample consist of 1987 company-event entities from 2010 through 2019. Dependent variable is cumulative abnormal return for the three-day event window. Explanatory variable is the indicator variable high *trust* score, equal to 1 if company headquarters is in country scoring above median level of weighted average trust and democracy score, otherwise 0. Controls for ESG, incident/event and company characteristics are included.

Column (1) trust and controls for company financial characteristic is applied to explain cumulative abnormal returns, which yield no significant result. Although the effect of trust displays similar effect on CAR(-1,1) as zero RRI, considering the direction and scope of the coefficient. Company size, represented by the company market capitalisation, has a positive effect on CAR(-1,1), significant on 5 percent level. Adding controls for reputational ESG risk and short-term risk trend does not change the estimates significantly. RR-rating, benchmark against peers, and country/sector yield no effect on CAR(-1,1).
In column (4) variables for incident characteristics are included, and severe incidents have significant negative impact on cumulative abnormal return on a 5 percent level. The size of these coefficients is smaller than depicted in table 6.4. One possible explanation is that the majority of incidents for companies located in trust countries happens abroad, which could potentially influence the estimates. When accounting for the incident's location, the negative impact of a severe incident is further diminished, as shown in column (5). Hench the effect of national and regional incidents might have smaller impact on CAR for a company activity abroad. Compared to the first set of subsamples, zero RRI, where incident's location are more evenly distributed between the subsamples.
Coefficient estimates for company size is significant at 5 percent level for all 5 specifications and depict positive change in cumulative abnormal returns.

7. Validity

I will address relevant issues challenging the validity of estimated results.
Kothari and Warner (2006) highlights that the actual economic effect from an event differs by company and can cause cross correlation in abnormal returns.
Controlling for confounding events and the decision to use the time period between two global macroeconomic events[5], both measures are meant to elevate potential problems regarding cross correlation in abnormal returns. I have also corrected returns for stock-splits and dividends. Although, the sample consist of global selection of companies, so it should be noted that industry, regional and national economic events are not considered. Decision of a smaller event window should also mitigate risk of confounding events.

[5] The Global financial crisis 2007-2009 and the COVID-19 pandemic

A second assumption for event studies are the unexpectedness of the event, or the information content it represents. Kothari and Warner (2006) elevate two cases, companies that have a higher degree of attention from media or analyst, and companies that execute self-selection to event. The later creating an endogeneity problem. Companies that receive more attention on ESG issues, typically larger companies, industries associated with higher ESG risk (e.g., oil and gas), or companies that have a large frequency of ESG incidents. The anticipation of ESG incidents could dilute any market reaction and be difficult to capture in small event windows. The dataset from RepRisk allow selection of events on "newness" of the ESG incidents, reoccurring or ongoing incidents was removed in the sampling proses. The dataset contains only ESG incident that is new to the market. I expect this will mitigate issues linked to anticipated incidents. I use a subsample of companies that have no media or stakeholder attention in the period leading up to the event. The comparative group is associated to reputational ESG risk. This could impact the results, if there is a considerable number of companies in this group having higher frequency of ESG issues. I expect dilution of market reactions from ESG incident would have been the case, I find a significant market reaction from ESG incidents for this subsample of companies.

To prevent errors of inference, standard error is corrected for heteroscedasticity and clustered at industry level, which should provide unbiased test statistics. These standard errors allow for correlation within clusters, however assumed to be uncorrelated across clusters.
Omitted variables and miss specification of multivariate regression models can cause bias in the regression coefficients. I have applied a fixed effect regression to account for unobserved industry effects on cumulative abnormal returns. In addition, controls are included to account for variation in cumulative return that is not due to the key explanatory variable. This includes financial performance, company size, profitability in addition to ESG and incident characteristics. A relevant issue connected to sample selection, is the predominance of environmental incidences, 82 percent of all incidents in sample is on environmental issues. I expect this to affect investor valuation of ESG incidents and if chosen explanatory variables is relevant to explain differences in cumulative anormal returns.

Choice of model for estimation of normal return can impact the results. I have applied the four-factor market model, to capture broader market variation in returns. Choice of estimation method have little impact on inference if changes in market prices are considerable and the

event window is just covering a few days (Brown and Warner, 1985). I have also used daily data on company return which should benefit the process of identifying market reactions.

8. Conclusion

ESG incident do not impact companies market value when considering all global companies collectively. Plausible explanation could be that the ESG information missing implications for financial impact, although the dataset should feature only material incidents. A second factor is information quality and uncertainty. Roubini & Mihm (2010) highlight that in the presence of high degree of uncertainty accurate pricing of information is challenging. Investors seem to value companies differently on the basis of company traits.

I expand my analysis by examine the two sets of subsamples. If investors value ESG incident differently, this would be present when studying market effect on mean cumulative abnormal return on respective samples. I test two sets of subsamples, representing different company traits, independently. I find that investor values negative information for companies that do not show traits in line with ESG incidents prevention. These companies also underperformed those that do. Company traits which indicate a prerequisite for efficient risk management do not have any significant effect on mean cumulative anormal return.

Companies that do not show ability to prevent ESG incidents experience significant reduction in mean cumulative returns. If investors are uncertain about the impact of information content on ESG issues this could also impact how they value negative ESG information. One possible explanation for why investors value the absent of ESG prevention might be because it is easier to calculate costs from an incident that have happened, than the gain achieved by the fact that the event never happens. If investors believe the absent of certain traits make companies less suitable to manage consequences of ESG incidents, it can impact financial management, hence yield cashflow effects. This result is in line with investor valuation of positive information for companies associated with reputational ESG risk. Krüger (2014) examine the relationship between positive and negative corporate social responsibility information and investor valuation. The study finds that investor values positive information for companies which display poor stakeholder relations (Krüger, 2014)

The result being substantiated when looking at cross sectional variation. Investors treat these companies differently, based on company characteristic. The companies with reputational ESG risk at the time of incident are at average representing lower RR-rating, located in countries with higher adjusted trust score and operates in industries associated with slightly higher country-sector average risk, than companies in compared group.
In order to draw inference about the relationship between abnormal returns and firm characteristics, I apply set of control on ESG, incident and economic conditions. Compared to companies displaying reputational ESG risk I find a positive effect on cumulative abnormal returns for companies that show abilities for preventing ESG incident.

Investors do not value negative ESG information for companies showing prerequisite for efficient ESG risk management. The majority of environmental incidents in the sample can be of significance. Earlier research show that trust can promote governance performance in large companies (La Porta et. al., 1996) If trust have little impact on environmental performance, it is likely to affect the outcome of this analysis. Liang and Renneboog (2017) find that countries legal origins is better at predicting companies' social responsibility performance than company and country characteristics. The inference could be that stakeholder cooperation and ESG risk management skill is not essential for environmental performance and consequently yield no effect on cumulative returns.
I find no significant effects for companies showing prerequisite for efficient risk management. Location of where the incident occur could also impact the effect of explanatory variables on cumulative abnormal returns. Estimated effect of company trait, displaying a prerequisite for efficient risk management, on cumulative abnormal return strengthens when controlling for the distribution of incident locations. Companies located in trust countries experience at average more incidents reaching over borders. The cross-sectional analysis provided no further insight on companies selected on these characteristics and cumulative abnormal returns.

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Appendix

Table 1: Variable descriptions

Variables:	Description
Trust	Dummy variable takes the value 1 if company headquarters is in a country associated above the median value of trust index. This index is calculated as the weighted mean of a country associated trust score and democracy index
Zero RRI	Dummy variable takes the value 1 if company have no associated reputational ESG risk at the event date and during the time leading up to the incident. No news and stakeholder coverage during the estimation window or at the time of ESG incident. Zero RRI is equal to 0 otherwise.
RRI status	Takes the value of the company reputational risk exposure at the time of event date. Range from 0-100
Adjusted trust score	Weighted WVS trust scores and Democracy Index scores.
ESG risk trend	Pre event, short-term risk trend. Development in RRI from event date, over a 30-day lookback period. E.g., Negative values indicate a decrease in short term RRI. Range from -100 to 100.
RR-rating	Benchmark against peers ESG business conduct risk exposure. Range from low risk yielding high rated: A, AA, AAA, B, BB, BBB, C, CC, CCC and D for high risk and low rating.
Country/sector risk	Weighted average of the country-sector and international ESG risk exposure
High severity	Dummy for incidents that is categorised at high severity. The variable is based on the consequence from the incident, how comprehensive and if incident is caused by accident, negligence, intent, or systematic failures. Each take value equal to 1 for corresponding incident categorised by RepRisk as medium or high severity, otherwise equal to 0.
National/regional source International sources	Dummy variable based on the influence of the source of information, based upon the reach of information about incident. The sources are pre assorted according to readership and circulation. Each take value equal to 1 for corresponding reach of source reporting information on the incident, categorised by RepRisk as national/regional or international reach, otherwise equal to 0.
Country of incident	Dummy variable takes the value 1 if the impact of incident occurs in the same country as the company headquarters. For impact from incidents that occur in other countries than the company headquarters the variable takes the value 0. This also includes incidents that have an impact at the country of headquarters *and* other countries.
Leverage	Financial risk is measured by leverage for the company. Calculated from book-values, long term debt and current liabilities divided by the market value of total assets. Market value of assets are the difference between book value of assets and equity, then adding the market value of the equity.
Market capitalisation	Logarithm of the market value of the company. Market capitalization is calculated from outstanding share times closing share price.
ROA	Financial performance is measured by the return on assets. Calculated by using book values of operating income before depreciation divided by total assets.

Note on calculations of financial variables in Compustat:

Market capitalization is included to control for size, the variable is constructed by adjusted daily closing prices and number of outstanding shares at time (t) for company (i).

$$Market \text{ capitalization}_{i,t} = Adjusted\ price\ close\ daily_{i,t} * Outstanding\ shares_{i,t} \quad (1)$$

Controlling for financial risk, the variable leverage is defined as the company total debt scaled by the market value of total asset.

$$Leverage = \frac{Long\ term\ debth + Current\ liabilities}{Marketvalue\ total\ Assets} \quad (2)$$

Controlling for profitability return on assets (ROA)

$$ROA = \frac{Operating\ Income\ befor\ depreciation}{Total\ assets} \quad (3)$$

Table: World Value Survey, trust score

Table: World Value survey trust scores

UNSD	ISO	Country	WVS2/3 (1990-1994)	WVS6 (2010-2014)	WVS7 (2017-2021)	Mean trust
36	AUS	Australia		51,4	48,5	50,0
40	AUT	Austria	31,8			31,8
50	BGD	Bangladesh			12,9	12,9
76	BRA	Brazil		7,1	6,5	6,8
100	BGR	Bulgaria	30,4			30,4
152	CHL	Chile		12,4	12,9	12,7
170	COL	Colombia		4,1	4,5	4,3
208	DNK	Denmark	57,7			57,7
818	EGY	Egypt		21,5	7,3	14,4
246	FIN	Finland	62,7			62,7
250	FRA	France	22,8			22,8
276	DEU	Germany			44,6	44,6
826	GBR	Great Britain			45,4	45,4
344	HKG	Hong Kong		48	36,4	42,2
352	ISL	Iceland	43,6			43,6
360	IDN	Indonesia			4,6	4,6
372	IRL	Ireland	47,4			47,4
380	ITA	Italy	35,3			35,3
392	JPN	Japan		35,9	33,7	34,8
400	JOR	Jordan		13,2	15,9	14,6
446	MAC	Macau SAR			41,4	41,4
458	MYS	Malaysia		8,5	19,6	14,1
484	MEX	Mexico		12,4	10,5	11,5
528	NLD	Netherlands		66,1	55,4	60,8
554	NZL	New Zealand		55,3	56,6	56,0
566	NGA	Nigeria		15	13	14,0
578	NOR	Norway	65,1			65,1
586	PAK	Pakistan		22,2	23,3	22,8
604	PER	Peru		8,4	4,2	6,3
608	PHL	Philippines		3,2	5,3	4,3
616	POL	Poland		22,2		22,2
620	PRT	Portugal	21,7			21,7
643	RUS	Russia		27,8	22,9	25,4
702	SGP	Singapore		37,3	34,4	35,9
704	VNM	Vietnam			27,7	27,7
710	ZAF	South Africa		23,3		23,3
410	KOR	South Korea		26,5	32,9	29,7
724	ESP	Spain		19		19,0
752	SWE	Sweden		60,1		60,1
756	CHE	Switzerland	42,6			42,6
158	TWN	Taiwan ROC		30,3	30,8	30,6
764	THA	Thailand		32,1	28,9	30,5
792	TUR	Turkey		11,6	14	12,8
804	UKR	Ukraine		23,1	30,1	26,6

Table: Democracy index for countries in sample, 2010-2019.

Table: Democracy index 2010-2019

UNSD	ISO	Country	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	Mean democracy score
36	AUS	Australia	9,1	9,1	9,1	9,0	9,0	9,0	9,1	9,2	9,2	9,2	9,1	9,1
40	AUT	Austria	8,3	8,3	8,4	8,4	8,5	8,5	8,5	8,6	8,5	8,5	8,5	8,5
50	BGD	Bangladesh	5,9	5,6	5,4	5,7	5,7	5,8	5,9	5,9	5,9	5,9	5,8	5,8
76	BRA	Brazil	6,9	7,0	6,9	6,9	7,0	7,4	7,1	7,1	7,1	7,1	7,0	7,0
100	BGR	Bulgaria	7,0	7,0	7,0	7,0	7,1	6,7	6,8	6,7	6,8	6,8	6,9	6,9
152	CHL	Chile	8,1	8,0	7,8	7,8	7,8	7,8	7,8	7,5	7,5	7,7	7,8	7,8
170	COL	Colombia	7,1	7,0	6,7	**6,7**	6,6	6,6	6,6	6,6	6,6	6,6	6,7	6,7
208	DNK	Denmark	9,2	9,2	9,2	9,2	9,1	9,1	9,4	9,5	9,5	9,5	9,3	9,3
818	EGY	Egypt	3,1	3,4	3,4	3,3	3,2	3,2	3,3	4,6	4,0	3,1	3,4	3,4
246	FIN	Finland	9,3	9,1	9,0	9,0	9,0	9,0	9,0	9,1	9,1	9,2	9,1	9,1
250	FRA	France	8,1	7,8	7,8	8,0	8,0	8,0	7,9	7,9	7,8	7,8	7,9	7,9
276	DEU	Germany	8,7	8,7	8,6	8,6	8,6	8,6	8,3	8,3	8,3	8,4	8,5	8,5
826	GBR	Great Britain	8,5	8,5	8,5	8,4	8,3	8,3	8,3	8,2	8,2	8,2	8,3	8,3
344	HKG	Hong Kong SAR	6,0	6,2	6,3	6,4	6,5	6,5	6,4	6,4	5,9	5,9	6,3	6,3
352	ISL	Iceland	9,6	9,6	9,6	9,5	9,6	9,6	9,7	9,7	9,7	9,7	9,6	9,6
360	IDN	Indonesia	6,5	6,4	6,4	7,0	7,0	7,0	6,8	6,8	6,5	6,5	6,7	6,7
372	IRL	Ireland	9,2	9,2	9,2	9,2	8,9	8,7	8,7	8,6	8,6	8,8	8,9	8,9
380	ITA	Italy	7,5	7,7	8,0	8,0	8,0	7,9	7,9	7,7	7,7	7,8	7,8	7,8
392	JPN	Japan	8,0	8,0	7,9	8,0	8,0	8,1	8,1	8,1	8,1	8,1	8,0	8,0
400	JOR	Jordan	3,9	3,9	3,9	4,0	3,9	3,8	3,8	3,8	3,9	3,7	3,8	3,8
446	MAC	Macau SAR	2,3	3,3	3,1	3,1	3,1	3,0	3,0	3,0	3,1	3,1	3,0	3,0
458	MYS	Malaysia	7,2	6,9	6,5	6,5	6,4	6,5	6,5	6,4	6,2	6,2	6,5	6,5
484	MEX	Mexico	6,1	6,2	6,4	6,5	6,6	6,7	6,9	6,9	6,9	6,9	6,6	6,6
528	NLD	Netherlands	9,0	8,9	8,9	8,8	8,9	8,9	8,8	9,0	9,0	9,0	8,9	8,9
554	NZL	New Zealand	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3	9,3
566	NGA	Nigeria	4,1	4,4	4,4	4,5	4,6	3,8	3,8	3,8	3,8	3,5	4,1	4,1
578	NOR	Norway	9,9	9,9	9,9	9,9	9,9	9,9	9,9	9,9	9,8	9,8	9,9	9,9
586	PAK	Pakistan	4,3	4,2	4,3	4,3	4,4	4,6	4,6	4,6	4,6	4,6	4,4	4,4
604	PER	Peru	6,6	6,6	6,5	6,7	6,6	6,5	6,5	6,5	6,6	6,4	6,5	6,5
608	PHL	Philippines	6,6	6,7	6,7	6,9	6,8	6,8	6,4	6,3	6,1	6,1	6,6	6,6
616	POL	Poland	6,6	6,7	6,7	6,8	7,1	7,5	7,1	7,1	7,1	7,1	7,0	7,0
620	PRT	Portugal	8,0	7,4	7,8	7,9	7,8	7,8	7,7	7,9	7,8	8,0	7,8	7,8
643	RUS	Russia	3,1	2,9	3,2	3,2	3,3	3,4	3,6	3,7	3,9	4,3	3,5	3,5
702	SGP	Singapore	6,0	6,4	6,3	6,3	6,1	6,0	5,9	5,9	5,9	5,9	6,1	6,1
704	VNM	Vietnam	3,1	3,1	3,1	3,4	3,5	3,4	3,3	2,9	3,0	2,9	3,2	3,2
710	ZAF	South Africa	7,2	7,2	7,2	7,4	7,6	7,8	7,9	7,8	7,8	7,8	7,6	7,6
410	KOR	South Korea	8,0	8,0	8,0	7,9	8,0	8,1	8,1	8,1	8,6	8,1	8,1	8,1
724	ESP	Spain	8,2	8,1	8,1	8,3	8,3	8,1	8,0	8,0	8,0	8,2	8,1	8,1
752	SWE	Sweden	9,4	9,4	9,4	9,4	9,5	9,7	9,7	9,7	9,5	9,5	9,5	9,5
756	CHE	Switzerland	9,0	9,0	9,0	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1
158	TWN	Taiwan ROC	7,7	7,7	7,7	7,8	7,8	7,7	7,6	7,6	7,5	7,5	7,7	7,7
764	THA	Thailand	6,3	4,6	4,6	4,9	5,1	5,4	6,3	6,6	6,6	6,6	5,7	5,7
792	TUR	Turkey	4,1	4,4	4,9	5,0	5,1	5,1	5,6	5,8	5,7	5,7	5,1	5,1
804	UKR	Ukraine	5,9	6,0	6,0	5,7	5,7	5,4	5,8	5,9	5,9	6,3	5,9	5,9

Table: Summary statistic full sample

	Full sample			
List of variables	Mean	Median	Min	Max
Trust	0.560	1	0	1
Zero RRI	0.656	1	0	1
RRI status	6.084	0	0	63
ESG risk trend	-0.009	0	-13	44
RR-rating	4.009	4	1	10
Country/sector risk	39.337	37	4	87
High severity	0.047	0	0	1
National/regional reach	0.146	0	0	1
International reach	0.274	0	0	1
Country of incident	0.407	0	0	1
Adjusted trust score	20.647	21.410	5.403	37.469
Leverage	0.411	0.398	-11.168	3.375
Market capitalisation	25.450	25.156	15.562	33.114
ROA	0.0197	0.005	-6.935	2.295